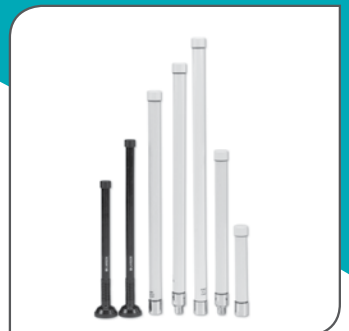
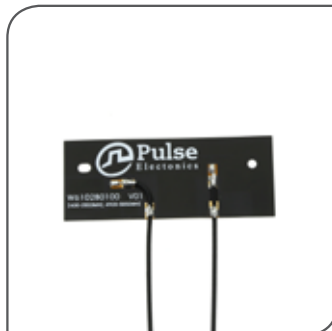
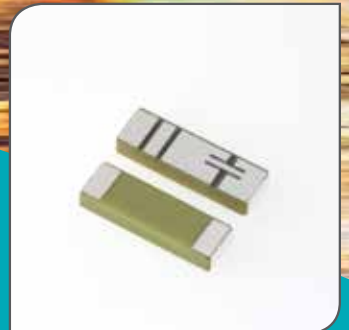
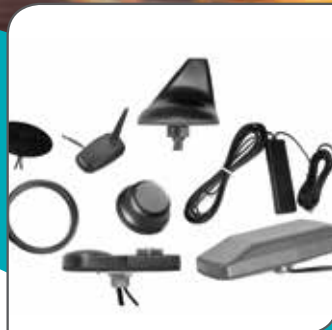


PulseLARSEN *Antennas*

SourceBook® Version 13



PulseLarsen Antennas is pleased to bring you the new, improved Antenna SourceBook (ASB), Volume 13. The goal of the ASB is to provide you with a “go to” source for all your antenna needs.

As the demand for wireless connectivity flourishes Pulse/Larsen is here with the needed solutions. We offer a unique far-reaching understanding of antenna and RF technology and have become the partner of choice for leading industry innovators. Pulse offers excellent value and outstanding quality products delivered from our high-volume production facilities. We offer a wide array of antennas covering 2G/ 3G/ 4G/5G , LTE, MiMo applications, WiFi, 2.4GHz, 5GHz, Zigbee, Bluetooth, GPS/ Glonass/ Beidou / Compass/ Galileo, any ISM frequency bands (169, 315, 433, 450, 868, 915, 2.4GHz), UHF, VHF, FM, DSRC, V2X, UWB and other applications.

You can rely on PulseLarsen to be your trusted antenna partner. We have been in the antenna business over 50 years and have exceeded over 2 Billion antennas shipped during that time. We supply consistent high-quality products by owning and fully controlling our own factories in both China and the United States. On the following pages you will find our more popular antennas. For an up-to-the-minute view of our offering visit our website at www.pulselarsenantennas.com.

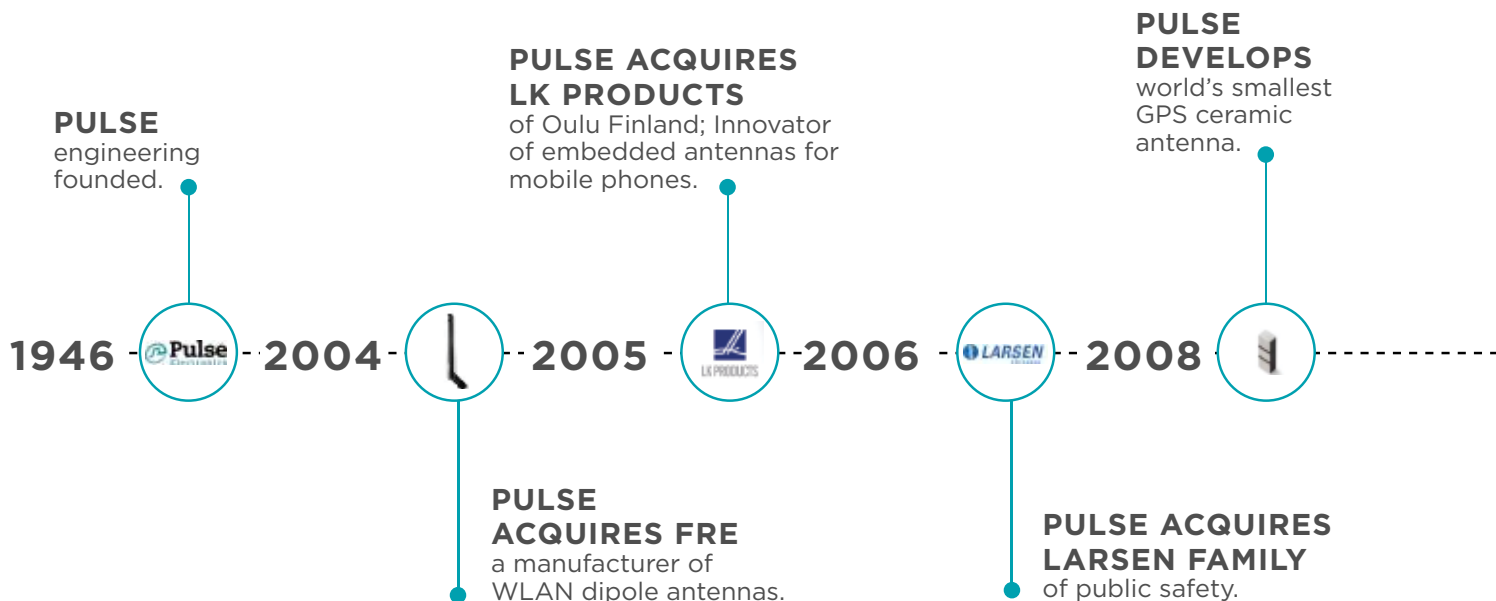
CONTACT US TODAY!



-  Call us at **+1.800.ANTENNA**
-  Visit our website at **pulselarsenantennas.com**
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Pulse continues as an Innovative Leader!





Distribution

PulseLarsen has partnered with the industry's leading wireless product distributors and sales representatives throughout the World. Our antennas are as close as a phone call away. Please find a list of our distributor and their live inventory on our website at: www.pulselarsenantennas.com and experience our "BUY NOW" button features.

Please find a list of our sales representatives and their dedicated territories at the following address:

1-800-ANTENNA (268-3662)

When you need an antenna, what better way than to remember 1-800-ANTENNA (268-3662). Our knowledgeable Customer Support staff is available to assist you.

For our international customers:

PHONE +1 - 360-944-7551

EMAIL

Americas: antennas.us@pulseelectronics.com

Europe: antennas.eu@pulseelectronics.com

Asia: antennas.as@pulseelectronics.com

Ordering

At Pulse/Larsen we understand managing your business in today's rapidly changing wireless communications market can be complicated. We want to make the process of doing business with us as easy as possible.

Whether it's your first order or you've been doing business with us for a while, each and every customer is equally important to us. From our experienced customer service associates to the latest in communications technologies, Pulse/Larsen strives to exceed your expectations with every transaction.

To order products, contact one of our authorized distributors. For a list of distributors, visit our web site at www.pulselarsenantennas.com.

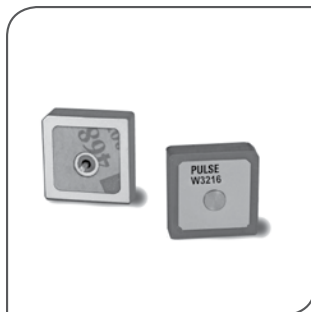


PULSE No-Nonsense™ Warranty

Every effort is made to assure the integrity and long life of each Pulse product. In the unfortunate event a problem does occur, you will find us ready to make it right!

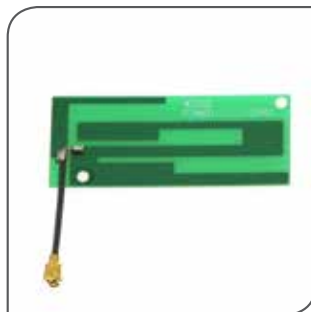
Duration of warranty is one year from date of purchase

Pulse will repair or replace without charge any Larsen antenna product which fails for any reason during the warranty period. Pulse is not responsible for any incidental or consequential damages due to failure of the antenna under this warranty or any implied warranty. This exclusion may not apply to all areas of the USA or Canada.



Embedded

Any antenna that can be surface mounted on the customer's PCB. In that category fall the helices, the Ceramic HTC antennas, the coils, and the composite material antennas.



Internal

Any antenna that are embedded in the customer's device but not visible from the outside, such as the cabled solutions based of FR4 and FPC, the active GPS modules & the NFC antennas.



External

That category is represented by the DAS antennas, the YAGI family, the Radome Omni family and the portables antennas.



Outdoor/Vehicular

Any antenna that can be mounted on top of a vehicle using connectors or a cable assembly with various types of connectors.

Embedded Applications		External Applications	
SMD / MINIATURE SOLUTIONS	Helical Antennas: High Efficiency 3D molded antennas for SMD process. Ideal for KeyFOB products and other small PCB foot-print areas (ISM 315MHz, 2.4GHz, 1.575GHz, ISM 433MHz). Ceramic Antennas: In-house ceramic manufacturing process allowing world smallest and most efficient compact antennas. All frequencies available such as: WiFi, BT, BLE, Zigbee, ISM, GPS, WiFi & GPS, GPS/GNSS/Beidou, Dual Band GSM. Composite Antennas: Ideal for cellular type of applications (2G/3G/4G) requiring compact and efficient antenna form factors.	DAS Family: Indoor LTE MIMO & SISO World Class Solutions (CLARITY: ultra thin 8.3mm height, translucent, high cosmetic finish) & (TRADITIONAL: Bulky Products) available with N, 4.3-10, mini-DIN connectors. Traditional Blade Antennas, Outdoor Radome Omnis and Yagis are available. Weather Proof IP65/67 Products, Direct Mount, with or w/o Bracket, Dipoles (Straight, Right angle), Radome Omni. All frequency bands available from 600MHz to 6GHz (Wlan, WiFi, GPS, 2G, 3G, 4G, LTE, UHF, VHF, Multi bands).	DAS DUCKIES & OUTDOOR VEHICULAR NMO MOUNT
	Cabled Antenna Solutions: Embedded within the device using low loss RF cables and standard connectors of your choice. Antenna substrate is based on FR4 and FPC. Antennas are mechanically fit within the design using snap-in features, adhesive, ribs or hooks. 2G/3G Solutions: WiFi Solutions: 2G/4G Solutions: NFC Solutions: Wide Range of 13.56MHz antennas with various shapes and dimensions on FPC substrate.	Pulse/Larsen develops all types of mounting, cables and connector solutions for vehicular applications. Any requirements from OEM, ODM or after market customers are available from 50MHz to 6GHz. Any Mounting solutions (Direct, Magnet, Adhesive). Any cable type and length & any connector types are available upon request. NMO Mount: Pulse/Larsen is the patent holder of the world renowned NMO MOUNT facilitating the antenna installation for vehicular applications.	

App.	Type	Pulse Part number	Frequency range (MHz)	RL Min. (dB)	Peak Gain (dBi)		RF Performance Efficiency (%)	
					Peak	Band edges	Peak	Band edges
868MHz (868MHz-870MHz)	Ceramic chip	W3000	868-870	-15	-1.4	-1.5	30	29
		W3013	868-870	-11	1.5	1.4	65	64
		W3016	868-870	-19	-2.2	-2.5	25	23
915MHz (902MHz-928MHz)	Helical	W3117	869-894	-9	0	-1.3	56	40
		W3118A	869-894	-9	0	-1.4	52	38
	Ceramic chip	W3012	902-928	-6	2	0.5	70	50
W3014		880-960	-7	-0.5	-1	45	40	
915MHz (902MHz-928MHz)	Helical	W3112A	902-928	-10	0.9	-0.3	67	50
		W3113	902-928	-10	0.8	-0.3	66	51
	Direct PCB	W3331	863-928	-6	1.7	0.9	64	53
2400-2500			-12	4	1.5	85	69	
868/915MHz and 2.4GHz	Direct PCB	W3333	863-928	-8	2.4	1.8	75	-
			2400-2500	-12	4.5	3.0	85	66
	Ceramic chip	W3015	433 +/- 1	-10	1.6	-	78	-
Helical		W3127	433-435	-15	-2.9	-	-	-
315 MHz	Helical	W3126	315	-10	-5	-	-	-
169 MHz	Helical	W3100	169MHz	-10	-4	-	55	-

Note: 1. ISM application for 902MHz-928MHz band (center frequency 915MHz). 2. Applications from ECA chart for 862MHz-890MHz. (a) Alarms: 868.6-869.7MHz, (b) RFID: 865-868MHz, (c) Tracking, tracing, and data acquisition: 870-875.6MHz, and (d) Wireless audio/ multimedia: 863-865MHz. 3. "Stock" Stocked parts are typically available from Pulse distribution partners immediately.

App.	Type	Pulse Part Number	Operating Frequency (MHz)	RL Min. (dB)	RF Performance		Efficiency (%)	
					Peak Gain (dBi)			
					Peak	Band edges	Peak	Band edges
Single WiFi, BT, Zigbee	Ceramic chip	W3000	2400-2483.5	-18	2.5	2.1	65	55
				-12	2.2	1.5	53	45
		W3001		-6	1.5	0.5	75	60
		W3008		-8	1.7	0.7	70	55
		W3008C		-11	2.2	1.9	75	70
		W3043		-12	4		70	
		W3092		-6	2	0	60	43
Dual WiFi	Ceramic chip	W3108		-8	1.5		50	
		W3006	2400-2483.5	-8	3.2	2.7	70	65
			5150-5850	-10	4.2	3.0	80	70
		W3078	2400-2483.5	-10	1.7	1.0	65	55
			4950-5850	-6	4.3	3.7	80	55
		W3079	2400-2483.5	-13	2.5	1.3	72	60
			4950-5850	-8	5.7	3.3	78	55
Combo GPS+WiFi or ISM 868/915 + WiFi	Ceramic chip	W3056	2400-2483.5	-8	3.2	2.5	80	70
			1575.42+ 10	-10	2.5	1.5	75	65
		W3064C	2400-2483.5	-11	-0.7	-1.7	80	70
			1575.42 + 10	-15		-2.0	70	60
			2400-2483.5	-11	2.5	1.5	85	80
			4950-5850	-6	3.5	1.0	70	50
		W3095	1559-1610.5	-10	1.5	0.8	75	60
			863-928	-8	1.5	0.8	67	55
		W3320	2400-2500	-6	3.4	1.4	61	45

*NOTE: 1. Recommended minimum GND dimensions of PIFA type and Monopole's are roughly 40x20mm and 30x20mm (or 40x11mm), respectively. Need to construct matching values to optimize antenna performance on surrounding mechanics and materials. 2. Pulse offers very unique GPS+WiFi combo antennas on single ceramic chip (10x3.2x1.5mm). There are three different types of combo antennas. W3056 (2.4G Wifi +GPS, single feed), W3064C (2.4G Wifi+GPS, dual feed), and W3095 (2.4G and 5G Wifi +GPS/Glonass/Beidou, dual feed). 3. "Stock" Stocked parts are typically available from Pulse distribution partners immediately.

App.	Type	Pulse Part number	Operating Frequency (MHz)	RL Min. (dB)	RF Performance					
					RHCP Gain (dBic)		Linear Gain (dBi)		Efficiency (%)/(dB)	
					Peak	Band edges	Peak	Band edges	Peak	Band edges
GPS Only	Ceramic chip	W3000	1575.42 +/-10	-15	-3.9	-4.1	0.3	0	50/-3	45/-3.5
		W3009		-12	-3.5	-3.9	0.1	-0.2	50/-3	45/-3.5
		W3011		-11	0.2	-0.6	3	2.3	83/-0.8	70/-1.5
	Patch	W3099		-12	0.85	0.5	3.4	3	85/-0.7	80/-1
		W3213		-14	3.5	-	-	-	-	-
	Helical	W3110		-13	-1.5	-	-	-	-	-
		W3110		-16	-2.1	-2.4	1.3	0.7	47/-3.3	43/-3.7
GPS, Glonass, & Beidou	Ceramic chip	W3000	1559-1591 1575.42 +/-10 and 1598-1610	-18	-0.2	-	2.4	1.5	70/-1.55	65/-1.9
		W3010		-12	1	0	3	2.2	75/-1.25	70/-1.5
		W3011A		-12	1.5	0.4	3	1.8	70/-1.55	50/-3.0
	Patch	W3062A		-16	1	-0.4	3.7	2.5	88/-0.6	70/-1.5
		W3216		-10	0	-0.5	2.5	2.0	80/-1	60/-2.1
		W3216		-7	-2	-	-	-	60	50
WiFi and GPS Combo	Ceramic chip	W3056	2400-2483.5	-8	-	-	3.2	2.5	80	70
		W3056	1575.42+ 10	-10	-	-	2.5	1.5	75	65
		W3064C	2400-2483.5	-11	-	-	-0.7	-1.7	80	70
		W3064C	1575.42 + 10	-15	-	-	-	-2.0	70	60
		W3095	2400-2483.5	-10	-	-	2.7	1.5	85	80
		W3095	4950-5850	-6	-	-	3.7	1.0	73	53
			1559-1610.5	-8	-	-	1.7	0.7	75	62

NOTE: 1. Recommended minimum GND dimensions of PIFA type and Monopole are roughly 40x20mm and 30x20mm (or 40x11mm), respectively. Need to construct matching values to optimize antenna performance on surrounding mechanics and materials. 2. Pulse offers very unique GPS+WiFi combo antennas on single ceramic chip (10x3.2x1.5mm). There are three different types of combo antennas. W3056 (2.4G Wifi +GPS, single feed), W3064C (2.4G Wifi+GPS, dual feed), and W3095 (2.4G and 5G Wifi +GPS/Glonass/Beidou, dual feed). 3. "Stock" Stocked parts are typically available from Pulse distribution partners immediately.

App	Type	Pulse Part Number	Frequency range (MHz)	RL Min. (dB)	RF Performance			
					Peak Gain (dBi)		Efficiency (%)/(dB)	
					Peak	Band edges	Peak	Band edges
LTE	Composite	W3796	698-960	-6	1.5 (Avg. peak gain)		65 (Avg.)	
			1427.9-1660.9	-5.5	2 (Avg. peak gain)		55 (Avg.)	
			1695-2200	-6	5.5 (Avg. peak gain)		75 (Avg.)	
			2300-2700	-6	5 (Avg. peak gain)		70 (Avg.)	
Penta Band		W3544A	824-960	-3.7	0.5	1.8	65	44
			1710-1880	-4.6	2.9	2.3	74	45
			1850-1990	-8.6	2.4	1.7	74	64
			1920-2170	-5.6	2.2	1.1	68	60
Quad band (US)		W3544B	824-960	-6.5	1	-0.7	70	53
			1710-1880	-5.7	2.7	1.7	77	59
			1850-1990	-9.3	2	1	77	69
			1920-2170	-5	1.8	0.2	71	58
Quad band (US)	W3073	824-894	-4.7	0.4	-2.6	51	28	
		1710-1880	-3.5	2.3	0.7	59	40	
		1850-1990	-5.9	2.5	1.6	59	54	
		1920-2170	-3.3	2.2	0.9	58	46	
Quad band (EU)	W3073	880-960	-3.8	1	-1.8	60	34	
		1710-1880	-4.9	2.9	2	70	54	
		1850-1990	-8	2.9	2.5	71	62	
		1920-2170	-4.4	2.8	2.3	67	59	
Dual band (EU)	W3070	880-960	-5.1	1.2	-0.4	65	47	
		1710-1880	-5.7	2.5	1.5	60	50	

NOTE: 1. "Stock" Stocked parts are typically available from Pulse distribution partners immediately. 2. * SE = Series and *SH = Shunt

INTERNAL ANTENNAS FOR MULTI-BANDS APPLICATIONS

App.	Type	Pulse Part Number	Operating Frequency (MHz)	RF Performance		Efficiency (%) / (dB)	
				RL Min. (dB)	Peak Gain (dBi) Peak Band edges	Peak	Band edges
ISM 868/915	FPC	W3312B0100	860-930	-8	2.3	-	50 (Avg.)
	PCB	W3332B0100	863-928	-5	0.2	-	55 (Avg.)
ISM WiFi Combo	PCB	W3525B039	2400-2500	-10	4.1	-	64 (Avg.)
	PCB	W3593B0100	2400-2483.5	-10	2	0.6	65 55
WiFi, BT, Zigbee	PCB	W3513B0212	4900-5850	-10	2	0.5	70 50
	FPC	W3315B0100	2400-2500	-13	2	1.4	70/-1.5 68/-1.7
	FPC	W3334B0150	4900-5850	-10	2.7	0.4	67/-1.8 52/-2.7
	FPC	W6102B0100	2400-2500	-10	2	-	65 -
	FPC	W6103B0100	4900-5875	-10	5	-	76 -
	FPC	W3502B0020	2400-2500	-10	4	-	52 (Avg.)
MIMO WiFi	FPC	W3538B0200	4900-5900	-10	5	-	80 (Avg.)
	FPC	W3501B0140	2400-2500	-10	1 (Avg.)	-	40 (Avg.)
	FPC	W3554B0140	4900-5900	-10	5 (Avg.)	-	75 (Avg.)
	PCB	W6112B0100	2400-2500	-10	4.5 (Avg.)	-	52 (Avg.)
3G	PCB	W3502B0020	824-960	-6	2	0.8	78/-1.2 55/-2.5
	PCB	W3538B0200	1710-1990	-4	2.4	-0.4	80/-0.95 70/-1.55
	FPC	W3501B0140	824-960	-6	-	-	57 41
	FPC	W3554B0140	1710-2170	-6	-	-	71 50
4G (LTE)	FPC	W3501B0140	824-960	-7	1.5	0.8	61 50
	FPC	W3554B0140	1710-1990	-8	4.2	2.8	71 50
MIMO 4G (LTE)	FPC	W3554B0140	698-798	-5	1.5	-0.6	75 50
	FPC	W6112B0100	824-960	-7	1.8	0.4	80 50
	FPC	W6112B0100	1710-2690	-8	3.9	1.9	86 65
	FPC	W6112B0100	698-960	-10	4.3 (Avg.)	-	55 (Avg.)
	FPC	W6112B0100	1428-2700	-8	3.8 (Avg.)	-	68 (Avg.)
	FPC	W6112B0100	3400-3600	-10	4 (Avg.)	-	65 (Avg.)

Note: 1. I-PEX MHF connector is U.FL compatible. Receptacle PN of IPEX MHF 20278-112R-13: 20279-001E (3pad), 20441-001E (4pad). Cable length is starting at an edge of PCB. 3. See datasheets for available cable lengths or contact the factory. 4. "Stock" Stocked parts are typically available from Pulse distribution partners immediately.

App.	Pulse Part number	Operating Frequency (MHz)	RF Performance				LNA		
			Antenna Element	VSWR	RHCP Gain (dBic)	Gain (dB)	NF (dB)	Current (mA)	VCC (Vdc)
GNSS (GPS, Glonass, BeiDou, and Galileo)	GPSGB1315			2	-1 + 1	15 + - 2	< 2.4	< 6	3.3-5 + - 0.5
	GPSGB1330			2	-1 + 1	30 + - 2	< 2.4	< 6	3.3-5 + - 0.5
		1561 +/- 2.046, 1575.42 +/- 10.23, and 1602.5625 +/- 4 MHz		2	1 + 1	15 + - 2	< 2.4	< 6	3.3-5 + - 0.5
	GPSGB2515			2	1 + 1	15 + - 2	< 2.4	< 6	3.3-5 + - 0.5
	GPSGB230			2	1 + 1	30 + - 2	< 2.4	< 6	3.3-5 + - 0.5

Note: 1. Further detailed specs such as 'Out of band rejection' of LNA can be found on a datasheet.



PulseLarsen Antennas

PulseLarsen also provides TS16949 GPS Patches for the Tier 1 automotive business as follows:

W3223: Center Pin, 25x25x4mm

W3224: Surface Mount, 18x18x4 mm

W3225: Surface Mount, 25x25x4mm

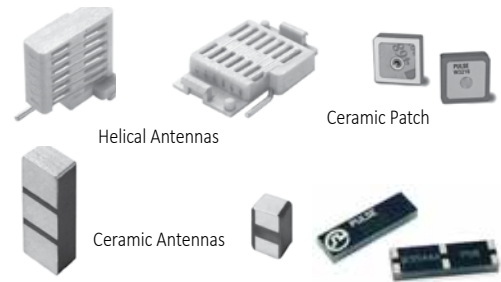
App.	Type	Pulse Part number	With matching network				RF Performance
			Frequency (MHz)	Reading distance EMVCo (mm)	Reading Distance Grid Scan (Avg.,mm)	Impedance (ohm)	Self resonant frequency (MHz)
NFC	Flex only	W7001	13.56	40	33	50/80	100
	Flex with Ferrite	W3579	13.56	40	28	50/80	42
		W7013	13.56	20	25	50/80	71.5
		W7000	13.56	-	36	50	75.5
	Flex with twisted pair cable + connector						
	Wire loop on plastic carrier	W7002	13.56	40	35	50/80	89
WiFi and NFC combo	Trace on PCB	W5100	13.56	-	-	50	65.9
			2400-2483.5	RL Min. (dB): -8		Peak Gain in free space: -1dBi	
		W5101	13.56	-	-	50	57.6
			2400-2483.5	RL Min. (dB): -8		Peak Gain in free space: 0.5dBi	

NOTE: 1. Wire assembly option: Picoblade connector with wire. 2. "Stock" Stocked parts are typically available from Pulse distribution partners immediately.

RF Performance						
	Type	Pulse Part number	Frequency range (MHz)	RL Min. (dB)	Peak Gain (dBi)	Height (mm) straight (Bent)
ISM	Stick/Swivel	W1063	868-928	-7.5	3	195 (172)
		W1063M	902-928	-10	3	195 (172)
	Stick/ no Swivel	W5012	868-928	-8	2	179
		W5017	868-928	-8	2	179
		W5021	868-928	-8	2	171
		W1010	2400-2500	-10	2	108 (86)
WiFi (2.4GHz)	Stick/Swivel	W1030	2400-2500	-10	2	108 (86)
		W1027	2400-2500	-11	3.2	136 (110)
		W1037	2400-2500	-10	3.2	197 (170)
		W1038	2400-2500	-10	3.2	197 (170)
		W1059	2400-2500	-10	5	195 (154)
		W5001	2400-2500	-10	1.5	128
	Stick/ no Swivel	W5010	2400-2500	-10	1.5	130
		W5011	2400-2500	-10	1.5	130
		W5039	2400-2500	-10	2	94
WiFi (5GHz)	Stick/Swivel	W1028B	5150-5850	-9	2	136 (114)
		W1043	2400-2500; 5150-5850	-10	2	157 (130)
WiFi Dual (2.4GHz + 5GHz)	Blade/ Swivel	W1044	2400-2500; 5150-5850	-10	2	157 (126)
		SPDA17RP2400/5900	2400-2500; 4900-5900	-10	0.8; 5.9	175 (150)
	Stick/ no Swivel	W5028	2400-2500; 5150-5850	-10	0	128
		SPDA24850/1900	824-894; 1850-1990	-7.5	0; 1.5	176 (147)
2G	Blade/ Swivel	SPDA17850/1900	824-894; 1850-1990	-10	0; 1.2	176 (147)
		W1900	824-960, 1710-2170	-4;-6	0.5; 2.5	49
	Stick/ no Swivel	W1902	824-960, 1710-2170	-4;-6	0.5; 2.5	49
		W1910	824-960, 1710-2170	-4;-6	0.5; 2.5	49
		W1911	824-960, 1710-2170	-4;-6	0.5; 2.5	49
		SPDA17806/2170	806-960; 1710-2170	-7.5	0.5; 0.5	192 (159)
3G	Blade/ Swivel	SPDA24700/2700	698-960; 1710-2170; 2500-2700	-7.5	0.6; 1.5; 3.4	223 (192)
		W5084K		-8	1.5; 2.5	229 (198)
	Blade/ Swivel	W5095K	698-960; 1447-1510; 1710-2170; 2500-2700	-9	2.0; 3.0	229 (198)
4G	Blade/ Swivel					

EMBEDDED ONTO / SOLDERED TO PCB

- Antenna Technology: Ceramic monopoles, ceramic PIFA, ceramic patch, helical; stamped metal, composite.
- Frequencies: WLAN(Wi-Fi), Zigbee, Bluetooth, ISM, GPS, 3G/4G LTE, Multi bands.
- Applications: OEM equipment, medical devices, security systems, tracking and monitoring devices, handhelds, meter reading, smart devices, sensors, wearables, fitness, beacons, and more.



Pulse offers a wide range of surface mount antennas (SMD) for wireless device applications. Pulse ceramic technology results in robust antenna designs that have outstanding performance. These antennas have an inherent immunity to surrounding antenna signals and hand-effect, which makes them exceptionally suitable solutions for small hand-held or wall-mount devices with multiple antennas. Pulse helical antenna technology provides high-performance antennas in a small package that can be easily deployed. Our composite antennas offer the most frequency bands per embedded technology. These ceramic, helical, and composite antennas require minimal ground plane removal for operation, which means saved board space and economical implementation. The SMD compatibility of Pulse's antenna products makes them simple and easy to mount.

CERAMIC								
Application	Part No.	Size ⁴ (mm)/ Type	Mount Type ³ (mm)	Frequency Range (MHz)	RHCP Gain ⁵ (dBic)	Max Gain (dBi)	Efficiency (%/dB)	Return Loss (dB MIN)
WiFi	W3001	10x3.2x4mm Ceramic	SMD, GC 10.8x6.25	2400	N/A	1.5 (peak)	75/-1.25	-6
WiFi Dualband	W3079	3.2x1.6x1.1 Ceramic	SMD, GC area 11.00x6.00	2400–2483.5 5150–5850	N/A	2.4 (peak) 5.7 (peak)	72% (peak) 78% (peak)	-13 -8
WiFi Dualband	W3006	10.0x3.2x1.5 Ceramic	SMD, GC area 11.60x6.00	2400–2483.5	N/A	3.2 (peak) 4.2 (peak)	70% (peak) 80% (peak)	-8 -10
Bluetooth/ WiFi	W3092	2.0x1.2x0.55 Ceramic	SMD, GC area 8.00x2.50	2400–2483.5	N/A	2,2 (peak)	75/-1.3 (peak)	-11
Bluetooth/ WiFi	W3008C	3.2x1.6x1.1 Ceramic	SMD, GC area 4.00x6.25	2400–2483.5	N/A	2,2 (peak)	75/-1.3 (peak)	-11
GPS	W3009	10.0x3.2x4.0 Ceramic	SMD, GC area 10.80x6.25	1575.42 ±10	0.7 (peak) 0.3 (band edges)	3 (peak)	80/-1.25 (peak)	-10
ISM	W3013	10x3.2x4 Ceramic	GC area 10.8x8.25	868-870	–	1.5	65	-11
WiFi & GPS	W3056	10x3.2x1.5 Ceramic	GC area 10.8x6.25 (Notch)	2400-2483.5 / 1575.42	–	3.2 / 2.5	80 / 75	-8 / -10
WiFi & GPS	W3064C	10x3.2x1.5 Ceramic	GC area 10.8x6.4 (Divided)	2400-2483.5 / 1575.42	–	-0.7 / -1	80 / 70	-11 / -15
GPS	W3213	13x13x4 Patch	--	1575.42	-1.5	--	--	-13
GPS	W3216	13x13x5 Patch	--	1575.42	-2	--	60	-7
GPS	W3099	25x25x4 Patch	--	1575.42	3.5	--	--	-14

1. All antennas are RoHS Compliant
 2. Operating temperature -40°C to +85°C
 3. GC = Ground Clearance, mm

4. Length x Width x Height
 5. Monopole antenna performance is linked to different tuning circuit recommendations for the variety of applications. Consult the data sheet for more information

INTERNAL ANTENNAS



- Located inside the device.
- Often connected by a short cable assembly to customer PCB.
- Technology: Flexible printed circuit (FPC), PCB, Patch.
- Frequencies: WLAN, Bluetooth, Zigbee, ISM, GPS, 3G/4G LTE, Multi bands.
- Typical applications: Access points, industrial controls, utilities, Internet of Things, M2M, telemedicine, handheld devices, point-of-sale equipment, sensors, lighting, transportation and other devices.

PRINTED CIRCUIT BOARD ANTENNA SOLUTIONS

Application	Frequency	Part Number	Mechanical Dimensions (in/Mm)	Cable Length (mm) /Connector Type	Gain (dBi)	Efficiency (%)
2G / 3G	850/900/1800/1900	W3501	0.98 x 3.43 x .008 25 x 87 x 0.2	56/ I-PEX Connector	1.5 / 1.5 / 3.5 / 3.5	50 to 55 %
2G / 3G	850/900/1800/1901	W3502	1.69 x 0.67 x 0.02 43 x 17 x 0.5	27.5/ I-PEX Connector	2 / 1 / 1 / 2	40 to 60 %
WiFi	2.4 GHz	W3525Bxxx	0.42 x 1.88 x .031 10.7 x 47.7 x 0.8	Various cable lengths/ I-PEX Connector	2	70%
WiFi	2.4 & 5 GHz	W3513	0.63 x 2.76 x 0.04 16 x 70 x 0.9	250/ I-PEX Connector	2	50 to 72 %
WiFi	2.4 & 5 GHz	W3315B0100	0.23 x 1.8in / 6x45 mm	100, I-PEX, MHF Series	-3.5 / -2.5	70%
3G 4G LTE	698-960 / 1710-2170 / 2300-2700	W3554B0140	120 x 30 x 0.2	143 / I-PEX	2.5	60%
5 GHz Dipole	4900-5850	W3593B0100	45 x 7 x 0.8	109mm / I-PEX	2	50%

ANTENNAS FOR NEAR FIELD COMMUNICATIONS

Frequency (MHz)*	Part Number	Read Distance (mm)*	Size (mm)	SRF (MHz)**	Inductance (uH)**	Resistance (Ohms)**	Q **	Matched Q ***
13.56	W3579	40	35 x 50 x 0.30	42	1.6	3.6	37.8	5-30
13.56	W7001	40	25 x 25 x 0.12	100	0.9	1.55	49	5-30
13.56	W7002	40	94.6 x 56.8 x 3.65	89	0.65	0.95	57	5-30
13.56	W7013	20	25 x 30 x 0.23	-	-	-	-	-

* With Matching Network

** Coil Without Matching Network

*** With Matching Network (adjustable range)

ANTENNA INTEGRATION

- Pulse can assist your engineering team to place/fix the antenna in the housing of the device. Antenna position, orientation, and cable routing can all impact the efficiency of the antenna inside the device.
- PCB-based antennas are best placed on flat surfaces for both physical and RF stability with the surrounding structure. Adhesives, slots, or snap-in features can be designed to hold antennas in place.
- FPC-based antennas are provided with adhesive tape for easy assembly in the device.

PRINTED CIRCUIT BOARD ANTENNA SOLUTIONS - MIMO AND MULTI-BAND

			RF Performance				Mechanical Requirements				
Application	Type	Pulse Part Number	Operating Frequency (MHz)	RL Min. (dB)	Peak Gain (dBi Max)	Efficiency, Max %	Antenna DIM. (LxWxH,mm) / Coax Orientation	Cable Length from PCB edge/ Coax Diameter, mm)	Connector Type; / Adhesive	Note	
ISM WiFi Combo	FPC	W3312B0100	860-930	-8	2.3	50 (Avg)	75 x 15 Perpendicular	L:100 / D:1.13	U.FL compatible / Adhesive Included	Alternative: W3502, W3538 , W3501	
ISM WiFi Combo	PCB	W3332B0150	863-928	-5	0.2	55 (Avg)	82 x 15 x 0.56 Perpendicular	L:150 / D:1.13	U.FL compatible / Adhesive Included	ISM 868/915 and 2.4GHz WiFi (two feed cables). Isolation: <-11dB.	
			2400-2500	-10	4.1	64 (Avg)					
WiFi, BT, Zigbee	PCB	W3525B039	2400-2483.5	-10	2	65	48 x 11 x 0.8 Perpendicular	L:100 / D:1.13	U.FL compatible / Adhesive Not Incl.		
		W3593B0100	4900-5850	-10	2	70	45 x 7 x 0.8 Perpendicular	L:100 / D:1.13	U.FL compatible / Adhesive Not Incl.		
		W3513B0212	2400-2500	-13	2	70	16 x 70 x 0.9 Parallel	L:212 / D:1.13	U.FL compatible / Adhesive Included		
			4900-5850	-10	2.7	67					
		W3921B0100	2400-2500	-13	1.8	57	33 x 7.7 x 0.1 Perpendicular	L: 100/ D:1.13	U.FL compatible / Adhesive Included	W3921BXXXX (for custom cable length)	
	FPC	W3315B0100MHF1	2400-2500	-10	2	75	45 x 6 x 0.1 Parallel	L:100 / D:1.13	U.FL compatible / Adhesive Included	W3315B0100 (MHF-A13) W3315B0100MHFIII (MHFIII 20367)	
			4900-5875	-10	5.5	85					
		W3334B0150	2400-2500	-10	4.8	53	14 x 5 x 0.1 Parallel	L:150 / D:1.13	U.FL compatible / Adhesive Included		
			4900-5900	-10	5.5	90					
		W3917B0050	2400-2500	-10	2.7	62	42.6 x 8.6 x 0.15 Parallel	L:50 / D:1.13	U.FL compatible / Adhesive Included	Parallel cable alignment. See W3917BXXXX (for custom cable length)	
MIMO WiFi	FPC	W3918B0050	2400-2500	-10	3.8	73	35.2 x 8.5 x 0.15 Perpendicular	L:50 / D:1.13	U.FL compatible / Adhesive Included	Perpendicular cable alignment. See W3918BXXXX (for custom cable length)	
			4900-5925	-10	5.3	90					
		W6102B0100	2400-2500	-10	2 (Avg.)	45 (Avg)	50 x 20 x 0.1 Perpendicular	L:100 / D:1.13	U.FL compatible / Adhesive Included	Isolation: -20 dB	
			4900-5900	-10	5 (Avg.)	75 (Avg)					
		W6103B0100	2400-2500	-10	4.5 (Avg.)	70 (Avg)	80 x 20 x 0.1 Perpendicular	L:100 / D:1.13	U.FL compatible / Adhesive Included	Isolation: -15 dB	
	4900-5900		-10	5 (Avg.)	75 (Avg)						
	PCB	W3502B0020	824-960	-6	2	78	43 x 17 x 0.5 Perpendicular	L:20 / D:1.13	U.FL compatible / Adhesive Included	80mm ground plane with 5mm gap inside plastic box	
			1710-1990	-4	2.4	80.0					
		W3538B0200	824-960	-6	-	57	40 x 15 x 0.7 Perpendicular	L:200 / D:1.13	U.FL compatible / Adhesive Included		
			1710-2170	-6	-	71					
W3501B0140		824-960	-7	1.5	61	87 x 25 x 0.2 Perpendicular	L:140 / D:1.13	U.FL compatible / Adhesive Not Incl.	Test unit : 150x100x40. With Adhesive: W3571B0140.		
4G (LTE)	W3554B0140	698-798	-5	1.5	75	120 x 30 x 0.2 Perpendicular	L:140 / D:1.13	U.FL compatible / Adhesive Included	Connected on a test board 120x120 with 10mm gap		
		824-960	-7	1.8	80						
MIMO 4G (LTE)	FPC	W6112B0100 (2 leads)	1710-2690	-8	3.9	86					
			698-960	-6	isolation: -10	55 (Avg)	224 x 20 x 0.1 Perpendicular	L:100 / D:1.13	IPEX MHF 20278 or equiv. / Adhesive Included		
			1428-2170	-7.5	isolation: -14	68 (Avg)					
		2300-3600	-10	isolation: -15	65 (Avg)						
		W6113B0100 (3 leads)	698-960	-6	isolation: -10	55 (Avg)	224 x 20 x 0.1 Perpendicular	L:100 / D:1.13	IPEX MHF 20278 or equiv. / Adhesive Included	GPS (1575MHZ)	
			1428-2170	-7.5	isolation: -14	68 (Avg)					
	2300-3600		-10	isolation: -15	65 (Avg)						
	PCB	W6113B0100 (3 leads)	698-960	-6	isolation: -10	55 (Avg)	224 x 20 x 0.1 Perpendicular	L:100 / D:1.13	IPEX MHF 20278 or equiv. / Adhesive Included		
1428-2170			-7.5	isolation: -14	68 (Avg)						



EXTERNAL ANTENNAS

SINGLE-BAND EXTERNAL ANTENNAS WITH I-PEX

Part Number	Frequency	Mechanical Length	Cable Length	Photo
W1049B030	2.4GHz	3.25/82.5	3/76	
W1049B050	2.4GHz	3.25/82.5	5/127	
W1049B090	2.4GHz	3.25/82.5	9/229	
W1049B120	2.4GHz	3.25/82.5	12/305	

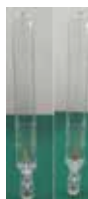
Pulse offers a wide variety of alternative wireless solutions for applications including machine-to-machine, public safety, hand-held radios, and telematics.

ADDITIONAL 3G/4G LTE, ISM, UHF, VHF, GPS, IP67

Part Number	Frequency (MHz)	Gain (dBi)	Description	Length (in/mm)	Coax	Connector
SPDA24918	863-973	0	Swivel Mount Dipole (E)	8 / 202	N/A	SMA Male
W1900; W1902	824-960/ 1710-1990/ 1920-2170	1 / 2 / 2.5	Penta Rt Angle Stubby (F)	2.1 / 49.5	N/A	SMA Male / RP-SMA Male
W1910; W1911	824-960/ 1710-1990 / 1920-2170	1 / 2 / 2.5	Penta Band Stubby (G)	2 / 49	N/A	SMA Male / RP-SMA Male
W4000G197	1.574 GHz	1.5 dBic / 26dB LNA	GPS Ultra Thin (H)	n/a	200 / 5meter	SMA Male
SPDA17RP2400/5900	2400-2500/4900-5900	1.6/5	Swivel Mount Dipole (J)	7/182	N/A	RPTNC
SB450FME3	450-470	2.14	Stealth Blade (A)	10/254	3' RG-174	FME
SB8003	806-896	2.14	Stealth Blade (A)	2.5/132	3' RG-174	No Conn
SB9003	890-960	2.14	Stealth Blade (A)	2.5/132	3' RG-174	No Conn
SPDA24850/1900	824-894/1850-1990	0/1.2	Swivel Mount Dipole (J)	6.75/171	N/A	SMA
SPDA24700/2700	698-960 / 1710-2710 / 2500-2700	.6/1.5/3.4	LTE Swivel Mount Dipole (J)	9 / 228	N/A	SMA Male
SPWB23150	136-174	-4.5	Wideband (D)	6.75/171	N/A	SMA F T3
SPWH23832	782-882	0	Whip, Standard, ¼ Wave (C)	3/76	N/A	SMA F T3
SPHS24832	800-864	0	Helical, Standard, ¼ Wave (B)	3/76	N/A	SMA F T2
SPDA17806/2170LAR	806-960/1710-2170	.5/.5	Pentaband Swivel Mount Dipole (J)	7.5/190.5	N/A	TNC Male
W1920G0915	806-960/1710-2170	1.5	Stealth Blade (A)	4.3/110	3' RG-174	SMA Male
W1920G3658	806-960/1710-2170	1.5	Stealth Blade (A)	4.3/110	9' RG-174	SMA Male



ICE BLADE (IP67) (XXXX)



Now Available: IceBlade Transparent Antennas

- LTE Model with SMA : Pulse part : ICEBLADELS
- LTE Model with TNC : Pulse part : ICEBLADELT
- WiFi Model with SMA : Pulse part : ICEBLADEWS
- WiFi Model with TNC : Pulse part : ICEBLADEWT

See [PulseAntennas website](http://PulseAntennas.com) for performance data.

The following chart summarizes performance, size and cost parameters for various antenna types.

ANTENNA PERFORMANCE CHART

Type	Bandwidth	Performance	Length	Connector	Frequency	Pricing
Helical Short	6%	Poor (**)	Short	All	VHF/UHF	\$\$
Helical	8%	Average (***)	Shorter	All	Low/Mid/VHF/UHF	\$\$
Helical Quarter Wave	12%	Good (***)	Longer	All except SMA	VHF	\$\$
Whip	12%	Good (***)	Mid	All	UHF	\$
End Fed Half Wave	10%	Better (****)	Longer	Coaxial	800	\$\$\$
Half Wave Dipole	10%	Best (*****)	Longer	Coaxial	800	\$\$\$\$
Wide Band	25%	Good (***)	Longer	Coaxial	All	\$\$\$\$\$
Dual Band	2x8%	Average (***)	Mid	Coaxial	VHF/UHF	\$\$

Due to the high variability of use, measurements are difficult to make on portable antennas. All Larsen portable antenna designs are tested for gain and VSWR using a standard fixture for portable antennas. Gain measurements are determined based on range or chamber measurements. Performance ratings are determined using a VSWR standard of less than 2.0:1.



- Call us at **+1.800.ANTENNA**
- Visit our website at **pulselarsenantennas.com**
- Connect with us on twitter **PulseLarsen1**

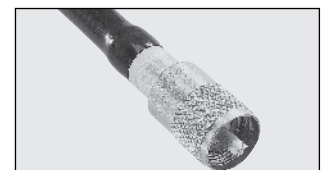
PART NUMBER	ELECTRICAL TYPE	FREQUENCY BAND	APPROX LENGTH
5/16-32X3/8			
KD7FREQHQ1	HQ Helical 1/4 λ	136 - 140 MHz	9 1/2"
KD7FREQHQ2	HQ Helical 1/4 λ	142 - 149 MHz	9 1/2"
KD7FREQHQ3	HQ Helical 1/4 λ	150 - 161 MHz	9 1/2"
KD7FREQHQ4	HQ Helical 1/4 λ	162 - 174 MHz	9 1/2"



5/16-32X3/8

Male stud type mount
(KR type)
KD7

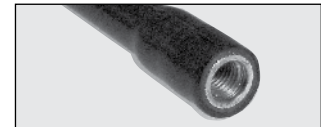
PL-259			
KD9FREQHQ1	HQ Helical 1/4 λ	136 - 140 MHz	9 1/2"
KD9FREQHQ2	HQ Helical 1/4 λ	142 - 149 MHz	9 1/2"
KD9FREQHQ3	HQ Helical 1/4 λ	150 - 161 MHz	9 1/2"
KD9FREQHQ4	HQ Helical 1/4 λ	162 - 174 MHz	9 1/2"
KD19(freq)	1/4 λ	406 - 512 MHz	6"
PQ	1/4 λ	144 - 512 MHz	Varies by freq



PL-259

Standard UHF Connector Male
KD9/19

5/16-24 THDS Female			
KD22VHF1	Helical 1/4 λ	136 - 141 MHz	8"
KD22VHF2	Helical 1/4 λ	142 - 149 MHz	8"
KD22VHF3	Helical 1/4 λ	150 - 161 MHz	8"
KD22VHF4	Helical 1/4 λ	162 - 174 MHz	8"
KD22FREQHQ1	HQ Helical 1/4 λ	136 - 140 MHz	9 1/2"
KD22FREQHQ2	HQ Helical 1/4 λ	142 - 149 MHz	9 1/2"
KD22FREQHQ3	HQ vv 1/4 λ	150 - 161 MHz	9 1/2"
KD22FREQHQ4	HQ Helical 1/4 λ	162 - 174 MHz	9 1/2"



516-24THDS Female

Female threaded
KD22

SPOTS!

M7 X 1.00 METRIC CONNECTOR (MD TYPE)

PART NUMBER	FREQUENCY BAND (MHZ)	ANTENNA TYPE	APPROX LENGTH
SPEN14832	806 - 866	Whip - 1/2 λ End Fed	7"
SPWH14832	782 - 882	Whip - Standard - 1/4 λ	3"
SPHS14832	800 - 865	Helical - Short - 1/4 λ	2.75 "
SPEN14918	890 - 960	Half λ End Fed	6"
SPHL14FT	Field Tunable 136 - 221	Helical - Standard - 1/4 λ	7"



M7.0X1.0

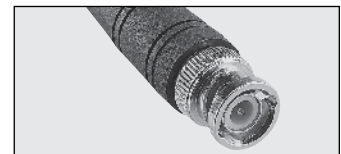
Male stud type connector unskirted (MD type)

Popular Brands Supported

G.E., Ericsson

BNC CONNECTOR (BN TYPE)

PART NUMBER	FREQUENCY BAND (MHZ)	ANTENNA TYPE	APPROX LENGTH
SPHS15450	432 - 468	Helical - Short - 1/4 λ	3"
SPHL15FT	Field Tunable 136 - 221	Helical - Standard - 1/4 λ	8"
SPWH15FT	Field Tunable 400 - 512	Whip - Standard - 1/4 λ	6"



BNC

BNC Male coaxial connector unskirted

Popular Brands Supported

G.E., Kenwood, Motorola, Maxon, Johnson

BNC CONNECTOR COVERED TYPE (BNX TYPE)

PART NUMBER	FREQUENCY BAND (MHZ)	ANTENNA TYPE	APPROX LENGTH
SPHL16FT	Field Tunable 136 - 221	Helical - Standard - 1/4 λ	8"
SPWH16FT	Field Tunable 400 - 512	Whip - Standard - 1/4 λ	6"



BNC-S

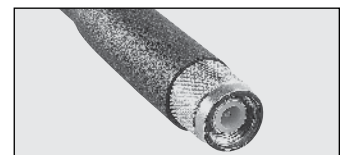
BNC Male coaxial connector fully skirted (BNX type)

Popular Brands Supported

Ericsson

TNC CONNECTOR - STANDARD (TN TYPE) - EXPOSED BRIGHT FINISH

PART NUMBER	FREQUENCY BAND (MHZ)	ANTENNA TYPE	APPROX LENGTH
SPDA17806/2170LAR	806 - 960 / 1710 - 2170	Center Fed Dipole	8"
SPDA17832	824 - 894	Center Fed Dipole	8"
SPDA17850/1900	824 - 894 / 1850 - 1990	Center Fed Dipole	7.5"
SPDA17918	890 - 960	Center Fed Dipole	8"
SPDA171800	1710 - 1850	Center Fed Dipole	6.5"
SPDA171900	1850 - 1990	Center Fed Dipole	6.5"
SPDA172400	2400 - 2500	Center Fed Dipole	6"
SPDA17RP2400	2400 - 2500	Center Fed Dipole	6"
SPDA17RP2400/5900	2400 - 2500 / 4900 - 5900	Center Fed Dipole	6"
SPDA17RP918	890 - 960	Center Fed Dipole	8"
SPHL17FT	Field Tunable 136 - 221	Helical - Standard - 1/4 λ	8"
SPWH17FT	Field Tunable 400 - 512	Whip - Standard - 1/4 λ	6"
ICEBLADELT	698 - 960 / 1710 - 2170 / 2500 - 2700	Multiband	9"
ICEBLADEWT	698 - 960 / 1710 - 2170 / 2500 - 2700	Multiband	9"



TNC

TNC Male coaxial connector unskirted (TN type)

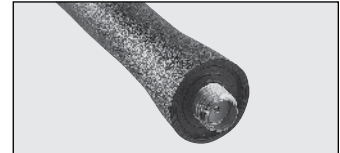
Popular Brands Supported

Icom, Standard

SPOTS!

SMA FEMALE STANDARD - FLUSH BASE - T2 (SFJ TYPE)

PART NUMBER	FREQUENCY BAND (MHZ)	ANTENNA TYPE	APPROX LENGTH
SPWB22150	136 - 174	Helical - Standard - $1/4 \lambda$	6.75"
SPHL22156	150 - 162	Helical - Standard - $1/4 \lambda$	8"
SPHL22167	160 - 174	Helical - Standard - $1/4 \lambda$	8"
SPWH22450	425 - 475	Whip - Standard - $1/4 \lambda$	6"
SPHS22450	432 - 468	Helical - Short - $1/4 \lambda$	3"
SPWH22470	450 - 490	Whip - Standard - $1/4 \lambda$	6"
SPHS22470	452 - 468	Helical - Short - $1/4 \lambda$	3"
SPHS22490	475 - 512	Helical - Short - $1/4 \lambda$	3"
SPWH22832	782 - 882	Whip - Standard - $1/4 \lambda$	3"
SPHS22832	800 - 864	Helical - Short - $1/4 \lambda$	2.75"
SPWH22918	863 - 973	Whip - Standard - $1/4 \lambda$	3"
SPHS22918	872 - 954	Helical - Short - $1/4 \lambda$	2.75"
SPHL22FT	Field Tunable 136 - 221	Helical - Standard - $1/4 \lambda$	8"
SPWH22FT	Field Tunable 400 - 512	Whip - Standard - $1/4 \lambda$	6"



SMA F T2

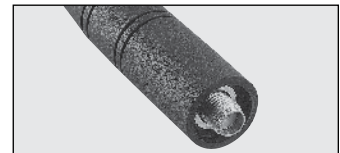
SMA Female recessed insulator & partial (short) skirt (SFJ type)

Popular Brands Supported

EF Johnson, Kenwood

SMA FEMALE STANDARD - HALF SKIRT BASE - T3 (SFU TYPE)

PART NUMBER	FREQUENCY BAND (MHZ)	ANTENNA TYPE	APPROX LENGTH
SPWB23150	136 - 174	Helical - Standard - $1/4 \lambda$	6.75"
SPHL23167	160 - 174	Helical - Standard - $1/4 \lambda$	8"
SPWH23450	425 - 475	Whip - Standard - $1/4 \lambda$	6"
SPHS23450	432 - 468	Helical - Short - $1/4 \lambda$	3"
SPWH23470	450 - 490	Whip - Standard - $1/4 \lambda$	6"
SPHS23470	452 - 488	Helical - Short - $1/4 \lambda$	3"
SPWH23490	470 - 512	Whip - Standard - $1/4 \lambda$	6"
SPHS23490	475 - 512	Helical - Short - $1/4 \lambda$	3"
SPWH23832	782 - 882	Whip - Standard - $1/4 \lambda$	3"
SPWH23918	863 - 973	Whip - Standard - $1/4 \lambda$	3"
SPHS23918	872 - 954	Helical - Short - $1/4 \lambda$	2.75"
SPHL23FT	Field Tunable 136 - 221	Helical - Standard - $1/4 \lambda$	8"
SPWH23FT	Field Tunable 400 - 512	Whip - Standard - $1/4 \lambda$	6"



SMA F T3

SMA Female recessed insulator & partial (long) skirt (SFU type)

Popular Brands Supported

Kenwood (2005 and newer models), Uniden, King

LOW BAND COILS/WHIPS

Model	Type	Frequency (MHz)	Gain (dBi)	Max Height (in)	Power Rating (Watts)	Whip Color	Cable Assembly/Mount
NMO27BCO	Loaded 1/4 λ	27-30		4	150	Coil Only	Order Separately
NMO27B	Loaded 1/4 λ	27-30	2	52.5	150	Black	Order Separately
NMO27C	Loaded 1/4 λ	27-30	2	52.5	150	Stainless	Order Separately
NMO30BCO	Loaded 1/4 λ	30-34		4	150	Coil Only	Order Separately
NMO30B	Loaded 1/4 λ	30-34	2	57.5	150	Black	Order Separately
NMO30C	Loaded 1/4 λ	30-34	2	57.5	150	Stainless	Order Separately
NMO34BCO	Loaded 1/4 λ	34-40		4	150	Coil Only	Order Separately
NMO34B	Loaded 1/4 λ	34-40	2	57.5	150	Black	Order Separately
NMO34C	Loaded 1/4 λ	34-40	2	57.5	150	Stainless	Order Separately
NMO40BCO	Loaded 1/4 λ	40-50		3.5	150	Coil Only	Order Separately
NMO40B	Loaded 1/4 λ	40-50	2	57.5	150	Black	Order Separately
NMO40C	Loaded 1/4 λ	40-50	2	57.5	150	Stainless	Order Separately
NMOWB40C	Loaded 1/4 λ	40-50	2	55	150	Stainless	Order Separately
NMO50BCO	Loaded 1/4 λ	47-54		3.5	150	Coil Only	Order Separately
NMO50B	Loaded 1/4 λ	47-54	2	52.5	150	Black	Order Separately
NMO50C	Loaded 1/4 λ	47-54	2	52.5	150	Stainless	Order Separately
NMOQ52C	1/4 λ	52-88	2	55	150	Stainless	Order Separately
NMOQ88C	1/4 λ	88-136	2	35	150	Stainless	Order Separately
Q52	1/4 λ	52-88	2	55	200	Stainless	Order Separately
Q88	1/4 λ	88-136	2	35	200	Stainless	Order Separately



NMO Low Band



NMOQ Low Band



NMOWB Low Band



Q Series Low Band

The most commonly used cable assembly/mount is the NMOKHFUD (27 MHz to 6 GHz) with 17' of UD (RG-58/U Dual Shield).

NOTE: Larsen springs (SPRING or SPRINGB) can be added to most mobile antennas.



VHF 136-220 MHz

VHF GLASS MOUNT

Model	Type	Frequency (MHz)	Gain (dBi)	Max Height (In)	Power Rating (Watts)	Whip Color	Cable Assembly/ Mount	Connector
KGFFREQUDPL2	VHF Disguise	140-149	2	20	100	Black	14' RG-58/U	PL-259
KGFFREQUDPL3	VHF Disguise	150-159	2	20	100	Black	14' RG-58/U	PL-259
KGFFREQUDPL4	VHF Disguise	160-170	2	20	100	Black	14' RG-58/U	PL-259
KG144O/S	1/2 λ	144-160	2	48	100	Black	Order Separately	
KG144UD	1/2 λ	144-160	2	48	100	Black	14' RG-58/U	No Conn
KG144UDPL	1/2 λ	144-160	2	48	100	Black	14' RG-58/U	PL-259
KG160O/S	1/2 λ	160-174	2	47	100	Black	Order Separately	
KG160UD	1/2 λ	160-174	2	47	100	Black	14' RG-58/U	No Conn
KG160UDPL	1/2 λ	160-174	2	47	100	Black	14' RG-58/U	PL-259
KGVHFUDI/S	Inside Cable Unit	144-174			100		14' RG-58/U	No Conn



Glass Mount



Low Profile

VHF LOW PROFILE

Model	Frequency (MHz)	Gain (dBi)	Size H x DIA (In)	Power Rating (Watts)	Color	Cable Assembly/ /Mount
LP152NMO	151.02-152.98	2	3.75 x 4.5	60	Black	Order Separately
LP154NMO	152.96-155.04	2	3.75 x 4.5	60	Black	Order Separately
LP156NMO	154.42-156.58	2	3.75 x 4.5	60	Black	Order Separately
LP158NMO	156.38-158.62	2	3.75 x 4.5	60	Black	Order Separately
LP160NMO	158.33-160.67	2	3.75 x 4.5	60	Black	Order Separately
LP162NMO	160.29-162.71	2	3.75 x 4.5	60	Black	Order Separately
LP164NMO	162.75-165.25	2	3.75 x 4.5	60	Black	Order Separately
LP167NMO	165.21-167.79	2	3.75 x 4.5	60	Black	Order Separately
LP169NMO	167.68-170.32	2	3.75 x 4.5	60	Black	Order Separately
LP171NMO	170.16-172.84	2	3.75 x 4.5	60	Black	Order Separately
LP174NMO	172.14-174.86	2	3.75 x 4.5	60	Black	Order Separately

The most commonly used cable assembly/mount is the NMOKHFUD (27 MHz to 6 GHz) with 17' of UD (RG-58/U Dual Shield).

UHF 406-512 MHz

UHF COILS/WHIPS

Model	Type	Frequency (MHz)	Gain (dBi)	Max Height (In)	Power Rating (Watts)	Whip Color	Cable Assembly
LMUHFBASEB	Base Only	406-512		2	200	Coil Only	Order Separately
LM406C	5/8 over 1/2 λ	406-420	5.6	33	200	Stainless	Order Separately
LM440C	5/8 over 1/2 λ	440-460	5.6	33	200	Stainless	Order Separately
LM450C	5/8 over 1/2 λ	450-470	5.6	33	200	Stainless	Order Separately
NMO4063CS	5/8 λ	406-430	5.14	19	200	Stainless	Order Separately
NMO4303CS	5/8 λ	430-450	5.14	19	200	Stainless	Order Separately
NMO4503CS	5/8 λ	450-470	5.14	19	200	Stainless	Order Separately
NMO4703CS	5/8 λ	470-490	5.14	19	200	Stainless	Order Separately
NMO4903CS	5/8 λ	490-512	5.14	19	200	Stainless	Order Separately
NMO406B	5/8 over 1/2 λ	406-420	5.6	33	200	Black	Order Separately
NMO406C	5/8 over 1/2 λ	406-420	5.6	33	200	Stainless	Order Separately
NMO420B	5/8 over 1/2 λ	420-440	5.6	33	200	Black	Order Separately
NMO420C	5/8 over 1/2 λ	420-440	5.6	33	200	Stainless	Order Separately
NMO440B	5/8 over 1/2 λ	440-460	5.6	33	200	Black	Order Separately
NMO440C	5/8 over 1/2 λ	440-460	5.6	33	200	Stainless	Order Separately
NMO450B	5/8 over 1/2 λ	450-470	5.6	33	200	Black	Order Separately
NMO450C	5/8 over 1/2 λ	450-475	5.6	33	200	Stainless	Order Separately
NMO470C	5/8 over 1/2 λ	470-490	5.6	33	200	Stainless	Order Separately
NMO490B	5/8 over 1/2 λ	490-512	5.6	33	200	Black	Order Separately
NMO490C	5/8 over 1/2 λ	490-512	5.6	33	200	Stainless	Order Separately
NMO406HWBCO	Base Only	406-420		2.5	200	Coil Only	Order Separately
NMO406CHW	1/2 λ Collinear	406-420	5.5	35.5	200	Stainless	Order Separately
NMO420CHW	1/2 λ Collinear	420-440	5.5	35.5	200	Stainless	Order Separately
NMO440CHW	1/2 λ Collinear	440-460	5.5	35.5	200	Stainless	Order Separately
NMO450HWBCO	Base Only	420-512		2.5	200	Coil Only	Order Separately
NMO450CHW	1/2 λ Collinear	450-470	5.5	35.5	200	Stainless	Order Separately
NMOQBASE1B	Base Only	Whip Size .070		2	200	Coil Only	Order Separately
NMOQBASE2B	Base Only	Whip Size .100		2	200	Coil Only	Order Separately
NMOQBASE3B	Base Only	Whip Size .125		2	200	Coil Only	Order Separately
NMOUHBBASEB	Base Only	Whip Size .100		2	200	Coil Only	Order Separately
NMOQW406	1/4 λ	406-430	2	7	200	Stainless	Order Separately
NMOQW450	1/4 λ	450-470	2	7	200	Stainless	Order Separately
NMOWB406BCO	Wide Band Coil	406-512		2.5	200	Coil Only	Order Separately
NMOWB406C	Wide Band	406-430	5.5	35.5	200	Stainless	Order Separately
NMOWB430C	Wide Band	430-455	5.5	35.5	200	Stainless	Order Separately
NMOWB450C	Wide Band	450-475	5.5	35.5	200	Stainless	Order Separately
NMOWB470C	Wide Band	470-495	5.5	35.5	200	Stainless	Order Separately
NMOWB490C	Wide Band	490-515	5.5	35.5	200	Stainless	Order Separately

LM

NMO CS

NMO400

NMOHW

NMOQW

NMOWB

The most commonly used cable assembly/mount is the NMOKHFUD (27 MHz to 6 GHz) with 17' of UD (RG-58/U Dual Shield).

NOTE: Larsen springs (SPRING or SPRINGB) can be added to most mobile antennas.



UHF 406-512 MHz

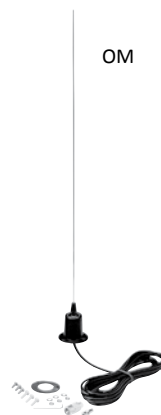
UHF DIRECT MOUNTS

Model	Type	Frequency (MHz)	Gain (dBi)	Size (In)	Power Rating (Watts)	Whip Color	Cable Assembly	Connector
LP450	Low Profile	450-470	2	1.25H x 5.25D	100	N/A	17' RG-58/U	No Conn
OM406BCO	1/2 λ	406-440		4	100	Coil Only	17' RG-58A/U	PL259
OM450BCO	1/2 λ	440-512		4	100	Coil Only	17' RG-58A/U	PL259
OM406CK	1/2 λ Collinear	406-420	5.5	35.5	100	Stainless	17' RG-58A/U	PL259
OM420CK	1/2 λ Collinear	420-440	5.5	35.5	100	Stainless	17' RG-58A/U	PL259
OM450CK	1/2 λ Collinear	450-470	5.5	35.5	100	Stainless	17' RG-58A/U	PL259
OM470CK	1/2 λ Collinear	470-490	5.5	35.5	100	Stainless	17' RG-58A/U	PL259

LP Direct Mount



OM



UHF MAGNETIC MOUNTS

Model	Type	Frequency (MHz)	Gain (dBi)	Max Height (In)	Power Rating (Watts)	Whip Color	Cable Assembly	Connector
MSTFME	Tunable 1/4 λ	144-965	2	21	50	Black	12' RG-174	FME Crimp
MSTBNCFT	Tunable 1/4 λ	144-965	2	21	50	Black	12' RG-174	TNC

MST

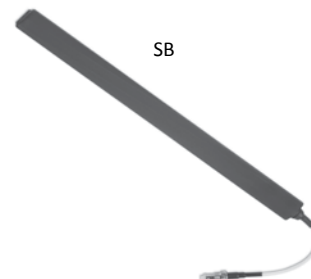


UHF STEALTH BLADES

Stealth Blade antennas have a gain of 2.14 dBi, a maximum power of 3 Watts and linear polarization.

Model	Frequency (MHz)	Bandwidth % @1.5/2.1	Dimensions L x W (In)	Coax	Connector
SB450FME12	450-470	20/30	10" x 0.75"	12' RG-316	FME

SB



TUNABLE 1/4 WAVE 136-960 MHz

TUNABLE 1/4 WAVE COILS/WHIPS

Model	Frequency (MHz)	Gain (dBi)	Max Height (In)	Power Rating (Watts)	Whip Color	Cable Assembly
NMOQSPEC	136-960	2	22	200	Stainless	Order Separately
NMOQSPECB	136-960	2	22	200	Black	Order Separately
NMOQC	136-512	2	23	200	Stainless	Order Separately
NMOQB	136-512	2	23	200	Black	Order Separately
PQ	136-512	2	22	200	Stainless	Order Separately
Q	136-512	2	22	200	Stainless	Order Separately
QB	136-512	2	22	200	Black	Order Separately



TUNABLE 1/4 WAVE MAGNETIC MOUNTS

Model	Frequency (MHz)	Gain (dBi)	Max Height (In)	Power Rating (Watts)	Whip Color	Cable Assembly	Connector
MSTFME	144-965	2	21	50	Black	12' RG-174	FME Crimp



The most commonly used cable assembly/mount is the NMOKHFUD (27 MHz to 6 GHz) with 17' of UD (RG-58/U Dual Shield).

700/800/900/1850 MHz COILS/WHIPS (CONTINUED)

Model	Type	Frequency (MHz)	Gain (dBi)	Max Height (in)	Power Rating (Watts)	Whip Color	Cable Assembly	Conn
NMOC/P3E	5/8 over 1/4 λ	824-960 1850-1990	4	4.7	10	Black	Order Separately	
NMOC/P3EUD	5/8 over 1/4 λ	824-960 1850-1990	4	4.7	10	Black	17' RG-58/U	No Conn
NMOC/P3EUDFME	5/8 over 1/4 λ	824-960 1850-1990	4	4.7	10	Black	17' RG-58/U	FME
NMOC/P3EUDMPL	5/8 over 1/4 λ	824-960 1850-1990	4	4.7	10	Black	17' RG-58/U	MPL
NMOC/P3EUDSMA	5/8 over 1/4 λ	824-960 1850-1990	4	4.7	10	Black	17' RG-58/U	SMA
NMOC/P3EUDTNC	5/8 over 1/4 λ	824-960 1850-1990	4	4.7	10	Black	17' RG-58/U	TNC



NMOC/P3E



KG3E



KG1

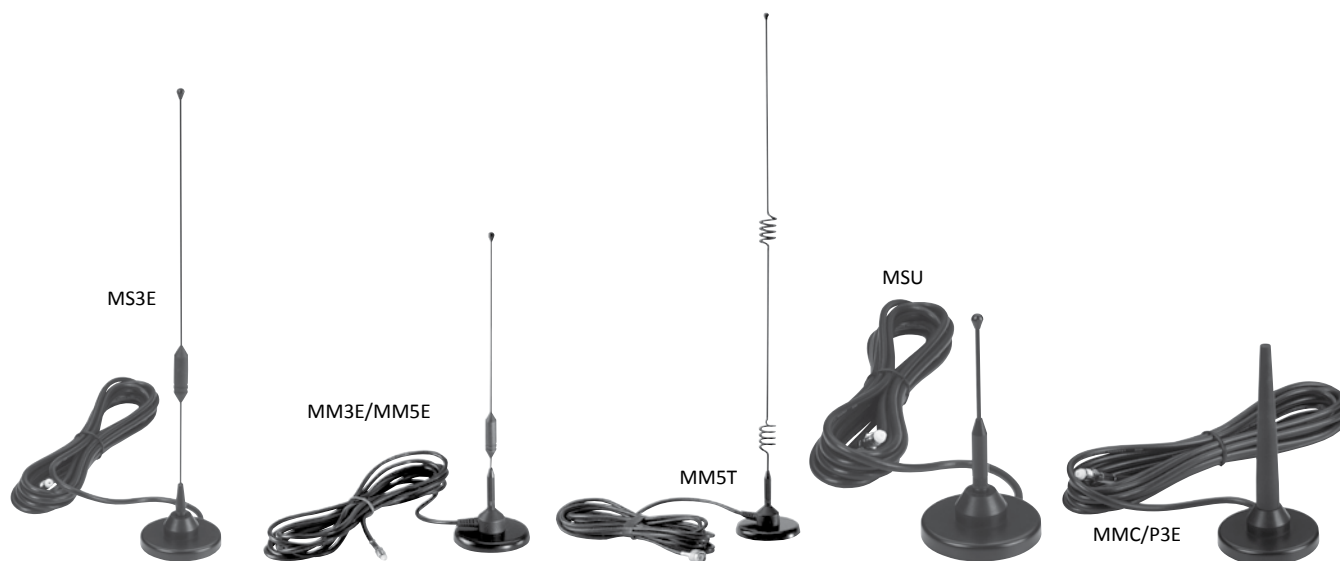
700/800/900/1850 MHz GLASS MOUNT

Optimum glass thickness 0.138" through 0.158"

Model	Type	Frequency (MHz)	Gain (dBi)	Height (in)	Rating (Watts)	Whip Color	Cable Assembly	Connector
KG1768	1/4 λ	768-896	2	-	60	Black	14' RG-58/U	No Conn
KG3E770	5/8 over 1/2 λ	764-869	-	-	60	Black	14' RG-58/U	No Conn
KG3E825UD	5/8 over 1/2 λ	806-896	5.14	13	60	Black	14' RG-58/U	No Conn
KG3E825UDFME	5/8 over 1/2 λ	806-896	5.14	13	60	Black	14' RG-58/U	FME
KG3E825UDMPL	5/8 over 1/2 λ	806-896	5.14	13	60	Black	14' RG-58/U	MPL
KG3E825UDTNC	5/8 over 1/2 λ	806-896	5.14	13	60	Black	14' RG-58/U	TNC
KG3E900UD	5/8 over 1/2 λ	890-960	5.14	13	60	Black	14' RG-58/U	No Conn
KG3E900UDFME	5/8 over 1/2 λ	890-960	5.14	13	60	Black	14' RG-58/U	FME
KG3E900UDMPL	5/8 over 1/2 λ	890-960	5.14	13	60	Black	14' RG-58/U	MPL
KG3E825O/S	5/8 over 1/2 λ	806-896	5.14	13	60	Black	Outside Coupler Only	
KG3E900O/S	5/8 over 1/2 λ	890-960	5.14	13	60	Black	Outside Coupler Only	
KG1825	1/4 λ Dipole	806-896	2		60	Black	14' RG-58/U	No Conn
KG3E/P3EUD	Cellular: Collinear PCS: 5/8 over 5/8 over 1/2 λ	824-896 1850-1990	5.14 5.14	13	7	Black	15' RB-58/U	No Conn
KG3E/P3EUDFME	Cellular: Collinear PCS: 5/8 over 5/8 over 1/2 λ	824-896 1850-1990	5.14 5.14	13	7	Black	15' RB-58/U	FME

700/800/900/1850 MHz MAGNETIC MOUNTS

Model	Type	Frequency (MHz)	Gain (dBi)	Max Height (In)	Power Rating (Watts)	Whip Color	Cable Assembly	Connector
MS3E800FME	5/8 over 1/2 λ	806-896	5.6	13	60	Black	12' RG-58A/U	FME
MS3E800MPL	5/8 over 1/2 λ	806-896	5.6	13	60	Black	12' RG-58A/U	MPL
MS3E800TNC	5/8 over 1/2 λ	806-896	5.6	13	60	Black	12' RG-58A/U	TNC
MS3E900MPL	5/8 over 1/2 λ	890-960	5.6	13	60	Black	12' RG-58A/U	MPL
MS3E900TNC	5/8 over 1/2 λ	890-960	5.6	13	60	Black	12' RG-58A/U	TNC
MS3E900SMA	5/8 over 1/2 λ	890-960	5.6	13	40	Black	12' RG-58A/U	SMA
MM5E900BNC	5/8 over 5/8 over 1/4 λ	890-960	7.12	16.5	60	Black	12' RG-58A/U	BNC
MM5T900SMA	5/8 over 5/8 over 1/4 λ	890-960	7.2	18	60	Black	12' RG-58A/U	SMA
MM5T900SMARP	5/8 over 5/8 over 1/4 λ	890-960	7.2	18	60	Black	12' RG-58A/U	SMA RP
MSU800FME	1/2 λ	806-896	2	4	40	Black	12' RG-58A/U	FME
MSU900FME	1/2 λ	890-960	2	4	40	Black	12' RG-58A/U	FME
MMC/P3EFME	5/8 over 1/4 λ	824-960	4	5	7	Black	12' RG-58/U	FME
		1850-1990	4					
MMC/P3EMPL	5/8 over 1/4 λ	824-960	4	5	7	Black	12' RG-58/U	MPL
		1850-1990	4					
MMC/P3ETNC	5/8 over 1/4 λ	824-960	4	5	7	Black	12' RG-58/U	TNC
		1850-1990	4					
MMC/P3ESMA	5/8 over 1/4 λ	824-960	4	5	7	Black	12' RG-58/U	SMA
		1850-1990	4					



GLASS MOUNT

GPS glass mount single band antennas have the following specifications:

Frequency:	1575.4 MHz	Gain:	1.5 dBi
Pattern:	Hemispherical	LNA Gain:	26 dB $\pm$ 2 dB
Polarization:	Right-Hand Circular	VSWR:	1.5:1
Mounting:	Double Sided Tape	Voltage:	3V or 5V DC

Model	Size H x L x W (In)	Color	Cable	Connector
GPSGMSMA	.2 x 3 x 1.2	Black	16.4' RG-174	SMA
GPSGMSMB	.2 x 3 x 1.2	Black	16.4' RG-174	SMB



GPSGMSMA

GPS LOW PROFILE SINGLE BAND

GPS low profile single band antennas have the following specifications:

Frequency:	1575.4 MHz	Gain:	5 dBic
Pattern:	Hemispherical	LNA Gain:	28 dB $\pm$ 2 dB
Polarization:	Right-Hand Circular	VSWR:	2.0:1
Mounting:	NMO Mount	Voltage:	5V DC

Model	Size H x D (In)	Color	Cable	Connector
GPSNMO01	1.3 x 2.9	White	Order Separately	Order Separately
GPSNMO02	1.3 x 2.9	Black	Order Separately	Order Separately
GPSNMO07	1.3 x 2.9	White	17' RG-58/U	SMB
GPSNMO08	1.3 x 2.9	Black	17' RG-58/U	SMB
GPSNMO09	1.3 x 2.9	White	17' RG-58/U	SMA
GPSNMO10	1.3 x 2.9	Black	17' RG-58/U	SMA



GPS LOW PROFILE



GPS0015

GPS TIMING ANTENNA

Model	Frequency (MHz)	LNA Gain ($\pm$ 2 dB)	Dimensions H x W (In)	Polarization	Voltage	Color	Mounting	Connector
GPS0015	1575.42 $\pm$ 1.023	25	4 x 4.5	RHCP	4V-15V DC	White	Bracket	N Male



GPS DIRECT MOUNT

NMOHFGPS mount have the following specifications:

Frequency:	1575.4 - 1576.4 MHz	Gain:	5 dBic
Polarization:	Right-Hand Circular / Vertical	LNA Gain:	26 dB $\pm$ 2 dB
Cable:	16.4' RG-174 (GPS)	VSWR:	Less than 2:1
	16.4' RG-58 (NMOHF)	Voltage:	3V or 5V DC
Size:	.5 x 2 x 4.5	Color:	Black
Mounting:	5/8" Hole		

Model	Connectors (mount / GPS)	Color
NMOHFGPSFMENOCNN	FME/No Connector	Black
NMOHFGPSFMESMA	FME/SMA	Black
NMOHFGPSNOCNN	No Connectors	Black
NMOHFGPSSMASMA	SMA/SMA	Black

NOTE: Specifications listed refer to GPS performance. Additional antenna specifications are dependent on the antenna mounted on the NMO side.

GPS MAGNETIC MOUNT

GPS single band magnetic mount antennas have the following specifications:

Frequency:	1575.4 MHz	Gain:	5 dBic
Pattern:	Hemispherical	LNA Gain:	26 dB $\pm$ 2 dB
Polarization:	Right-Hand Circular	VSWR:	Less than 2:1
Cable:	17' RG-174	Voltage:	5V DC

Model	Size H x L x W (In)	Color	Connector
GPS0002	0.5 x 1.75 x 1.5	Black	MCX
GPS0006	0.5 x 1.75 x 1.5	Black	SMB
GPS0008	0.5 x 1.75 x 1.5	Black	No Conn
GPS0010	0.5 x 1.75 x 1.5	Black	SMA
GPS0012	0.5 x 1.75 x 1.5	Black	BNC



GPS Single Band
Mag Mount

Contact factory for upcoming GNSS models covering GPS, Glonass, Beidou/Compass and Galileo



GPSPDM26B0500

GPS DIRECT MOUNT

GPS single band direct mount antennas have the following specifications:

Frequency:	1575.4	Polarization:	Right-Hand Circular
Gain:	4 dBic	Coax:	LMR-195
LNA Gain:	25 dB $\pm$ 2 dB	Voltage:	3V-5V DC
Pattern:	Hemispherical	Color:	Gray (Pantone 427)
Mounting:	Direct Feed 5/8" hole	Size:	.87" H x 1.97" Dia

Model	Cable Length	Connector	Color
GPSPDM26B0500	19.68" (500mm)	SMA	Gray (Pantone 427)

MULTI-BAND DATA ANTENNAS



GPS Multi Band
Mag Mount

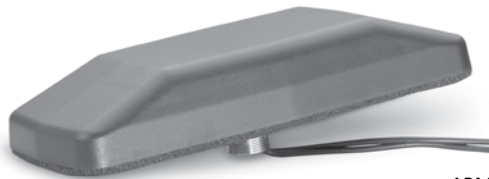
GPS MAGNETIC MOUNT

GPS & Cellular combo magnetic mount antennas have the following specifications:

Frequency: 824-960 / 1710-2170 / 1575.4 MHz
Gain: 2 dBi / 2 dBi / 5 dBic
LNA Gain: 26 dB $\pm$ 2 dB
Pattern: Omni / Omni / Hemispherical
Polarization: Vertical / Vertical / Right-Hand Circular
VSWR: Less than 2:1
Cable: 17' RG-174
Voltage: 3V or 5V DC

Model	Size H x L x W (In)	Color	Connector
GPSCPM00	1.3 x 7.6 x 3.4	Black	TNC/SMA
GPSCPM02	1.3 x 7.6 x 3.4	Black	No Conn/SMA

Contact factory for LTE versions.



ARMCP

ARMADILLO SERIES - MULTIBAND VEHICULAR DIRECT MOUNT ANTENNAS : GPS + LTE + WIFI

GPS, LTE and WiFi combination antenna in a low-profile mobile package.

Size: 7.6" (L) x 3.4" (W) x 1.32" (H)

[193mm x 86.4mm x 33.5mm]

Mounting: Direct Feed ; 3/4" hole required.

Model	Application	Frequency (MHz)	Gain (Typical)	Connection
ARMCP402	GPS/Glonass/Beidou	1559-1607	Antenna RHCP gain: 1 dBic typ. LNA Gain: 30 dB +/- 2dB	SMA (m)
		698-960	2 dBi	SMA (m)
	LTE1, LTE2	1710-2690	4 dBi	
		2400-2500	4 dBi	RP-SMA (m)
	WiFi	5150-5925	6 dBi	

Note: Contact factory for additional configurations of LTE, WiFi, and GPS. Contact factory for magnetic mount and adhesive mount configurations. White Housing is available.

NOTE: All NMO mount antennas listed in this catalog section require the NMOHF-style (high frequency 27 MHz - 6 GHz) mount.

PUBLIC SAFETY AND WIFI BROADBAND ANTENNAS

Model	Type	Frequency (MHz)	Gain (dBi)	Max Height (In)	VSWR	Cable Assembly
EF2405NMO	Elevated Feed	2400-2500	5	16	<1.5:1	Order Separately
EF4905NMO	Elevated Feed	4900-5000	5	12	<1.5:1	Order Separately
NMO4E4900B	Elevated Feed	4900-5350	4	4.5	2:1	Order Separately
NMO4E5350B	Elevated Feed	5350-5925	4	4.5	2:1	Order Separately
NMO5E2400B	Collinear	2400-2500	2.95	8.5	1.5:1	Order Separately



EF



NMO4E

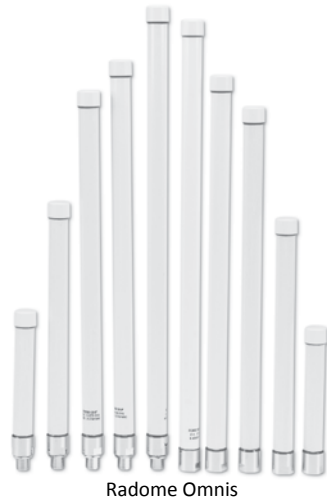


NMO5E



Through its rich history in the Larsen and LK brands, Pulse has over 50 years in the antenna business.

OUTDOOR ANTENNAS



Radome Omnis

LTE, 4G, BROADBAND RADOME OMNIS

Radome Enclosure: Pultruded Fiberglass (UV Protected)

VSWR: 2.0:1 **Power Rating:** 20 Watts

Ingress Protection: IP67 **Polarization:** Vertical

Suggested mounting brackets for N Female connectors are FB2BRACKET or FB3BRACKET. See Page 53 for FB brackets.

Model	Frequency (MHz)	Gain (dBi)	Length (In)	Connector
W5067 ⁽¹⁾	698-960	0.7	9.1	N Female
	1710-2170	1.0		
	2400-2700	2.0		
RO17102NM ⁽²⁾	1710-2170	2	4.5	N Male
RO8605NFC ⁽³⁾	860 - 930	5.0	32	N Female
RO2404NM	2400-2500	4	11.5	N Male
RO2406NF	2400-2500	6	11.5	N Female
RO2406NM	2400-2500	6	11.5	N Male
RO2408NF	2400-2500	8	20	N Female
RO2408NM	2400-2500	8	20	N Male
RO2408NFD (downtilt)	2400-2500	8	20	N Female
RO2408NMD (downtilt)	2400-2500	8	20	N Male
RO2408NFU (uptilt)	2400-2500	8	20	N Female
RO2408NMU (uptilt)	2400-2500	8	20	N Male
RO4910NF	4940-4990	10	18	N Female
RO4910NM	4940-4990	10	18	N Male
RO5206NF	5150-5350	6	6.75	N Female
RO5410NF	5470-5725	10	16.5	N Female
RO5210NF	5150-5350	10	16.5	N Female
RO5210NM	5150-5350	10	16.5	N Male
RO5410NM	5470-5725	10	16.5	N Male
RO5805NF	5150-5825	5	6.75	N Female
RO5805NM	5150-5825	5	6.75	N Male
RO5806NF	5725-5875	6	6.75	N Female
RO5810NF	5725-5875	10	16.5	N Female
RO5810NM	5725-5875	10	16.5	N Male
RO8063/21704NM	806-960	3	8.6	N Male
RO8063/21704NF	1710-2170	4		N Female
RO8061/21702NM	806-960	1	16.5	N Male
	1710-2170	2		
W5030	2400-2500	4	6.8	N Male
	5150-5875	6		
RO3ISMNM	430-440	2	21.3	N Male
	860-930	2.5		
RO25002NF ⁽²⁾	2300-2700	2.0	5.1	N Female

(1) 3 Watt Power (2) PIM Rated to -155 dBc (3) Bracket ROKIT Available. Contact Factory.

YAGIS

Construction: Fully Welded Elements

VSWR: 2.0:1

Power Rating: 300 Watts

Wind Load:

Feed Connection:

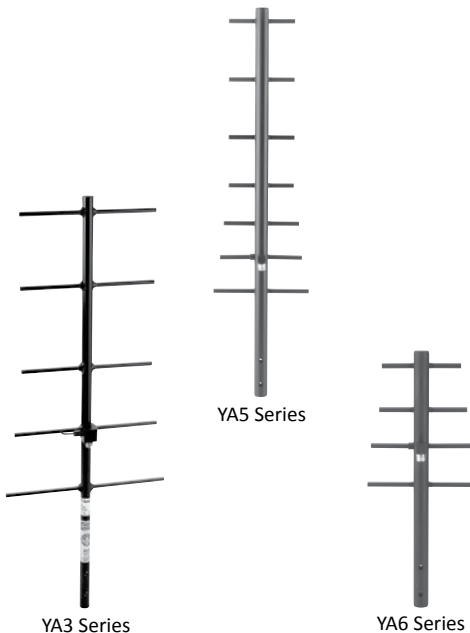
Mounting Hardware:

100 mph

N Female

Included

Model	# of Elements	Frequency (MHz)	Gain (dBi)	Length (In)
YA3406WN	5	406-430	11	42.25
YA3450WN	5	450-470	11	36.25
YA5740W	7	740-806	11	32.75
YA6740W	4	740-806	8	19.25
YA5800W	7	806-866	11	31.25
YA6800W	4	806-866	8	17.5
YA5825W	7	824-896	11	31.25
YA6825	4	824-896	8	17.5
YA5900W	7	890-960	11	30
YA6900W	4	890-960	8	17.5



Maker Of Clarity™ Transparent Antennas!

From Your **PIMinator™** Low-Pim Solutions Expert

Distributed Antenna Systems: As consumers switch to a lifestyle of constant internet connection, the demand on wireless networks increases dramatically. The carrier networks are switching from one of coverage to capacity. Previously coverage came via cellular base stations with tower-mounted antennas with vast reach to many consumers. The future networks need to fulfill capacity demands by bringing those networks closer to the consumer, with greater data throughput reaching customers in smaller coverage areas. To meet these very high data rates it's critical to have high quality innovative components such as Pulse Electronics PIMinator™ line of in-building low-PIM antennas, Pulse clarity™ transparent antennas and accessory components.



Clarity™ Transparent Antenna



Clarity™ White Antenna

ULTRA-THIN CLARITY™ ANTENNAS				
Clarity™ Series	Pulse Part Number	Freq, MHz	PIM Rating, dBc	Connector
Ultra-Thin Clear	DASUTCC500NF	608-960/1695-2200/2300-2700MHz, Antenna only	-155	N Female w/500mm pigtail
Ultra-Thin Clear	DASUTCCR500NF	608-960/1695-2200/2300-2700MHz, with Reflector	-155	N Female w/500mm pigtail
Ultra-Thin Clear	DASUTCC500MD	608-960/1695-2200/2300-2700MHz, Antenna only	-155	4.1-9.5 Mini-DIN Female w/500mm pigtail
Ultra-Thin Clear	DASUTCCR500MD	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.1-9.5 Mini-DIN Female w/500mm pigtail
Ultra-Thin Clear	DASUTCC5004310	608-960/1695-2200/2300-2700MHz, Antenna only	-155	4.3-10 DIN Female w/500mm pigtail
Ultra-Thin Clear	DASUTCCR5004310	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.3-10 DIN Female w/500mm pigtail
Clarity	DASUTCCACC1	Reflector	N/A	N/A
Ultra-Thin White	DASUTWC500NF	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.3-10 DIN Female w/500mm pigtail
Ultra-Thin White	DASUTWCR500NF	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.3-10 DIN Female w/500mm pigtail
Ultra-Thin White	DASUTWC500MD	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.3-10 DIN Female w/500mm pigtail
Ultra-Thin White	DASUTWCR500MD	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.3-10 DIN Female w/500mm pigtail
Ultra-Thin White	DASUTWC5004310	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.3-10 DIN Female w/500mm pigtail
Ultra-Thin White	DASUTWCR500431	608-960/1695-2200/2300-2700MHz, with Reflector	-155	4.3-10 DIN Female w/500mm pigtail



PSIBVHF and PSIBVU78



Installed Condition:
PSIBVHF and PSIBVU78



PSUTWCNF

PUBLIC SAFETY DAS PRODUCTS							
Application	Frequency, MHz	Series	Part Number	PIM Rating	Connector	Color	Size (inches / mm)
UHF + 700/800	380-570; 698-960	Clarity™-Pearl	PSUTWCNF	N/A	N-Female	White	12.3" (311mm) Diameter. 0.37" (9.5mm) Below ceiling
VHF	132-174	V-Thinity™	PSIBVHF	N/A	N-Female	White	15.0x15.0 inch (380x380mm) Below Ceiling: 0.060 inch (1.5mm)
VHF+UHF+700/800	132-174; 380-570; 700-960	V-Thinity™	PSIBVU78	N/A	N-Female	White	15.4 x 13.6 inch (391 x 346mm) Below Ceiling: 0.06 inch (1.5mm)"



PSDASxx Series Top View



PSDASxx Series Bottom View

PUBLIC SAFETY + CARRIER COMBO DAS PRODUCT							
Application	Frequency, MHz	Series	Part Number	PIM Rating	Connector	Color	Size (inches / mm)
UHF (Tetra) + 3G/4G LTE (or WiFi)	380-520; 698-960; 1710-2700; 4900-6000	5Bar	PSDAS4310F	N/A	4.3-10	White	11.3 Dia x 5.4 Tall (288mm Dia. X 136mm Tall)
UHF (Tetra) + 3G/4G LTE (or WiFi)	380-520; 698-960; 1710-2700; 4900-6000	5Bar	PSDAS4310FP	-150dBc (@2x20 watts)	4.3-10	White	11.3 Dia x 5.4 Tall (288mm Dia. X 136mm Tall)
UHF (Tetra) + 3G/4G LTE (or WiFi)	380-520; 698-960; 1710-2700; 4900-6000	5Bar	PSDASNF	N/A	N-Female	White	11.3 Dia x 5.4 Tall (288mm Dia. X 136mm Tall)
UHF (Tetra) + 3G/4G LTE (or WiFi)	380-520; 698-960; 1710-2700; 4900-6000	5Bar	PSDASNFP	-150dBc (@2x20 watts)	N-Female	White	11.3 Dia x 5.4 Tall (288mm Dia. X 136mm Tall)



ICEFIN Transparent



ICEFIN White

LOW COST MONOPOLE WITH GROUND PLANE SOLUTION									
Application	Frequency, MHz	SLPT White Series Antenna		IceFin™ Series Antenna		Peak Gain*	PIM Rating	Connector	Mechanical Properties
		Color	Part Number	Color	Part Number				
700/800	698-869	White	SLPT698/869DMNW	Transparent	ICEFIN698/869DMN	3.3 dBi	None	N-Female	1.5" dia x 3.1" tall (38mm dia. X 79 mm tall)
2G/3G/4G LTE	698-960 / 1710-2700	White	SLPT698/2170DMNW	Transparent	ICEFINLDMN	3.5 dBi (lower band) 4.95 dBi (upper band)	None	N-Female	1.5" dia x 3.1" tall (38mm dia. X 79 mm tall)

* Gain when using ground plane



Installed Configuration



Installed Configuration



Frame and Screws



Ground Plane

Application	Part Number	Mechanical Properties
Ground Plane (for use with above antennas)	ICEFIN-GP	15.75" Dia. X 0.040" thk (400mm Dia. X 1mm thk) Material: Aluminum"
Frame (for use with above antennas)	ICEFIN-F	2.95" Dia. (74.9mm Dia).

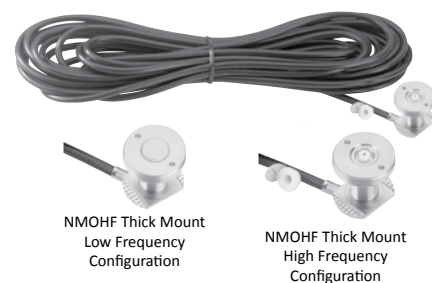
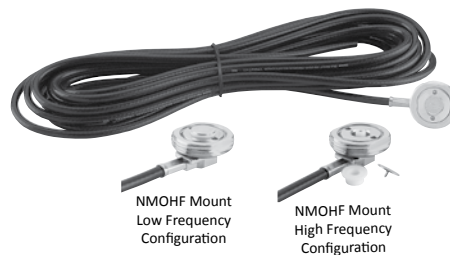
CABLE ASSEMBLIES/MOUNTS

All Larsen NMOHF (high frequency 27 MHz to 6 GHz) mounts convert from low frequency applications to high frequency applications and back by pulling or replacing the center pin and insulator.

NMOHF mounts require a 3/4" hole for mounting and include 17' of coax. NMOHF mounts accommodate roof surfaces from 0.1" to .03". NMOHFTHK (thick) mounts accommodates roof surfaces up to 1/2" thick.

NMO 3/4" HIGH FREQUENCY MOUNTS

Model	Coax	Connector
NMOKHFCX	CX (RG-58A/U)	No Conn
NMOKHFCXFME	CX (RG-58A/U)	FME CRIMP
NMOKHFCXMPL	CX (RG-58A/U)	MPL
NMOKHFCXPL	CX (RG-58A/U)	PL-259
NMOKHFDS	DS (RG-58A/U Dual Shield)	No Conn
NMOKHFUD	UD (RG-58U Dual Shield)	No Conn
NMOKHFUDFME	UD (RG-58U Dual Shield)	FME
NMOKHFUDMPL	UD (RG-58U Dual Shield)	MPL
NMOKHFUDSMA	UD (RG-58U Dual Shield)	SMA
NMOKHFUDTNC	UD (RG-58U Dual Shield)	TNC
NMOKHF200SMAI	LMR200	SMA Installed



NMO 3/4" HIGH FREQUENCY MID-SIZE MOUNTS

Model	Coax	Connector
NMOKHFIDCX	CX (RG-58A/U)	No Conn
NMOKHFIDDS	DS (RG-58A/U Dual Shield, Low Loss)	No Conn
NMOKHFIDUD	UD (RG-58U, Dual Shield)	No Conn



NMO 3/4" HIGH FREQUENCY THICK MOUNTS

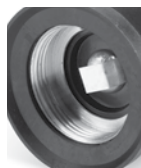
Model	Coax	Connector
NMOKHFCXTHK	CX (RG-58A/U)	No Conn
NMOKHFDSTHK	DS (RG-58A/U Dual Shield)	No Conn

If your antenna has a "tab" or "pin" connector, use the NMOHF mount in the low frequency configuration - leave the center pin and insulator in place as it arrives from the factory.

"Pin" connector



"Tab" connector



If your antenna has a "high frequency" (HF) connector, use the NMOHF mount in the high frequency configuration - remove the center pin and insulator.

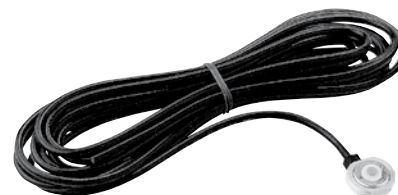
"HF" connector



NMO 3/4" STANDARD MOUNTS

NMO 3/4" standard mounts require a 3/4" hole for mounting and include 17' of coax.

Model	Coax	Connector
NMOKNOCONN	CX (RG-58A/U)	No Conn
NMOK	CX (RG-58A/U)	PL-259
NMOKFME	CX (RG-58A/U)	FME
NMOKMPL	CX (RG-58A/U)	MPL Crimp
NMOKDS	DS (RG-58A/U Dual Shield)	No Conn
NMOKDSFME	DS (RG-58A/U Dual Shield)	FME
NMOKUD	UD (RG-58U Dual Shield)	No Conn
NMOKUDFME	UD (RG-58U Dual Shield)	FME
NMOKUDPL	UD (RG-58U Dual Shield)	PL-259T
NMOKUDTNC	UD (RG-58U Dual Shield)	TNC



All Larsen NMOHF (high frequency 27 MHz to 6 GHz) mounts convert from low frequency applications to high frequency applications and back by pulling or replacing the center pin and insulator.

GPS LTE DIRECT MOUNTS

NMOHFGPS mounts have the following specifications:

Frequency:	1575.4 - 1576.4 MHz	Gain:	5 dBic
Polarization:	Right-Hand Circular / Vertical	LNA Gain:	26 dB $\pm$ 2 dB
Cable:	16.4' RG-174 (GPS)	VSWR:	Less than 2:1
	16.4' RG-58 (NMOHF)	Size:	.5 x 2 x 4.5
Voltage:	3 or 5 V DC	Color:	Black
Mounting:	5/8 " Hole		

Model	Connectors
NMOHFGPSFMENOCNN	FME/No Connector
NMOHFGPSFMESMA	FME/SMA
NMOHFGPSNOCNN	No Connectors
NMOHFGPSSMASMA	SMA/SMA

NOTE: Specifications listed refer to GPS performance. Additional antenna specifications are dependent on the antenna mounted on the NMO side.



NMO SQUARE MAGNETIC MOUNTS

NMO square magnetic mounts have the following specifications:

Size:	3.5" x 3"
Cable Length:	12'
Pull Strength:	50 lbs

Model	Coax	Connector
NMOMMNOCONN	CX (RG-58A/U)	No Conn
NMOMMMPL	CX (RG-58A/U)	MPL
NMOMM	CX (RG-58A/U)	58FCP
NMOMMBNC	CX (RG-58A/U)	BNC
NMOMMPL	CX (RG-58A/U)	PL-259
NMOMMFME	CX (RG-58A/U)	FME
NMOMMDSFME	DS (RG-58A/U Dual Shield)	FME



NMO TRUNK LID MOUNTS

NMO trunk lid mounts have the following specifications:

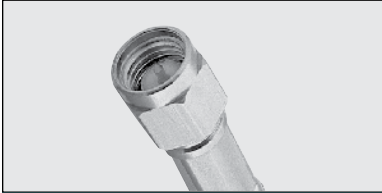
Size: 2.5" x 2"

Model	Coax	Cable Length	Connector
NMOTLP	CX (RG-58A/U)	17 ft.	PL-259
NMOTLPFME	CX (RG-58A/U)	17 ft.	FME
NMOHFTLP200NF	LMR-200	17 ft.	N-Female
NMOHFTLP200NF12	LMR-200	12 ft.	N-Female



CONNECTORS

SMA CONNECTORS



MODEL	DESCRIPTION
SMACP58	SMA Crimp Plug 58/U
CABLE GROUP	58

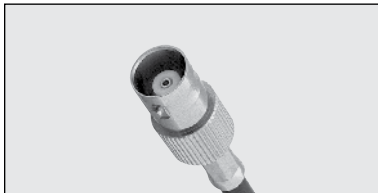


MODEL	DESCRIPTION
SMACJ	SMA Crimp Jack 58/U
CABLE GROUP	58

BNC CONNECTORS



MODEL	DESCRIPTION
BNCCRIMP	BNC Crimp Plug 58/U
CABLE GROUP	58



MODEL	DESCRIPTION
BNCCJ58	BNC Crimp Jack 58/U
CABLE GROUP	58



MODEL	DESCRIPTION
BNC174	BNC Crimp Plug 174/U
CABLE GROUP	174

N CONNECTORS



MODEL	DESCRIPTION
NCRIMP	N Crimp Plug 58/U
CABLE GROUP	58



MODEL	DESCRIPTION
N8	N Clamp Plug 8/U
CABLE GROUP	8



MODEL	DESCRIPTION
NCBJ58	N Crimp Blk Jack 58/U
CABLE GROUP	58

CONNECTORS

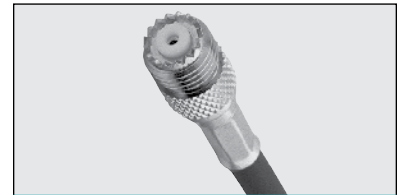
UHF CONNECTORS



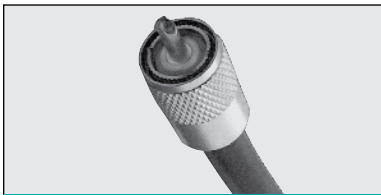
MODEL	DESCRIPTION
MPLCRIMP	M/UHF Crimp Plug 58/U
CABLE GROUP	58



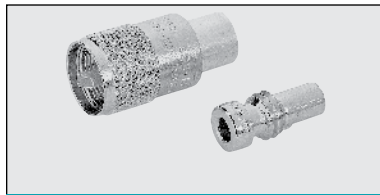
MODEL	DESCRIPTION
MPLCP	M/UHF Crimp Plug 174/U
CABLE GROUP	174



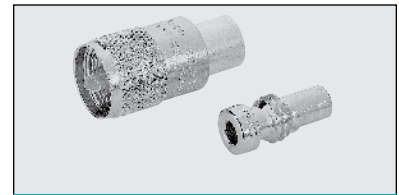
MODEL	DESCRIPTION
MPLCJ58	M/UHF Crimp Jack 58/U
CABLE GROUP	58



MODEL	DESCRIPTION
PL2598PHN	UHF Solder Plug PL 259/U
CABLE GROUP	8



MODEL	DESCRIPTION
PL259T	UHF Solder Plug PL259/U Teflon & Silver UG175 adapter 8/58
CABLE GROUP	



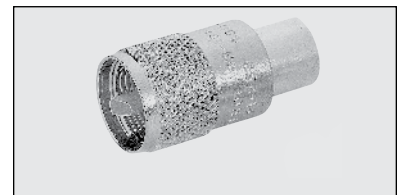
MODEL	DESCRIPTION
PL259	UHF Solder Plug PL259/U with UG 175 adapter 8/58
CABLE GROUP	



MODEL	DESCRIPTION
PLCP	UHF Crimp Plug 58/U
CABLE GROUP	58



MODEL	DESCRIPTION
58FCP	UHF FCP Plug 58/U
CABLE GROUP	58



MODEL	DESCRIPTION
PL2598	UHF Solder Plug PL259/U, Teflon & Silver Plate 8/58
CABLEGROUP	



MODEL	DESCRIPTION
UG175	UHF Reducing adapter 58/U
CABLE GROUP	58



MODEL	DESCRIPTION
PL258	UHF adapter J/J



MODEL	DESCRIPTION
UHFBJJ	UHF bulkhead

PARTS/ACCESSORIES



MODEL	DESCRIPTION
-------	-------------

6 x 32	Set Screws
8 x 32	Set Screws



MODEL	DESCRIPTION
-------	-------------

A4	BSA/BA/SO-239 to NMO mount adapter
----	------------------------------------



MODEL	DESCRIPTION
-------	-------------

BA	Bulkhead mount adapter with hardware
----	--------------------------------------



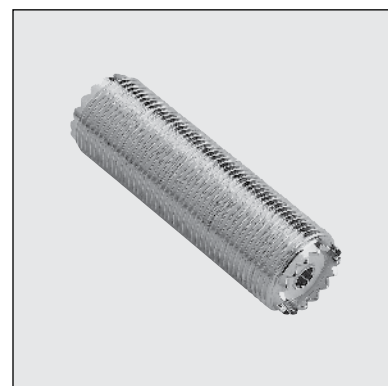
MODEL	DESCRIPTION
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BAHEXNUT	Hex nut for BA
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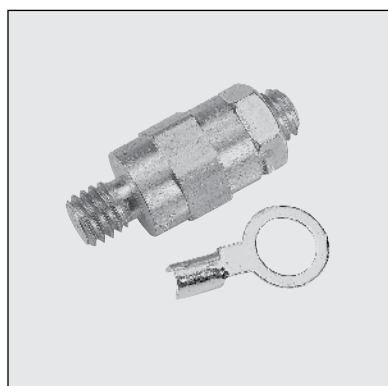
MODEL	DESCRIPTION
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BALL1B	Black teardrop rod tip for W490, W540 tapered rods
BALL2B	Black teardrop rod tip for Q and NMOQ antennas
BALL3B	Black teardrop rod tip for .100 diameter non-tapered rods
BALL4	Rod tip WBQ800 antennas



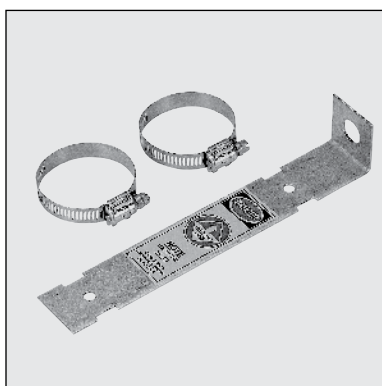
MODEL	DESCRIPTION
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BANOHardware	Bulkhead mount adapter without hardware
--------------	---



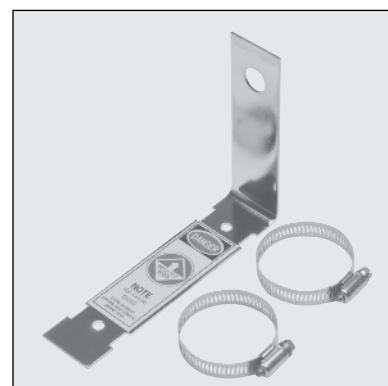
MODEL	DESCRIPTION
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BATTBOLT	Battery bolt with terminals, 3/8" ring leads
----------	--



MODEL	DESCRIPTION
-------	-------------

FB2BRACKET	Mounting bracket and hardware for FB2 series
------------	--



MODEL	DESCRIPTION
-------	-------------

FB3BRACKET	Mounting bracket and hardware for blade and round FB antennas
------------	---

PARTS/ACCESSORIES



MODEL	DESCRIPTION
-------	-------------

NMOCAPB	Rain cap for NMO mount
---------	------------------------



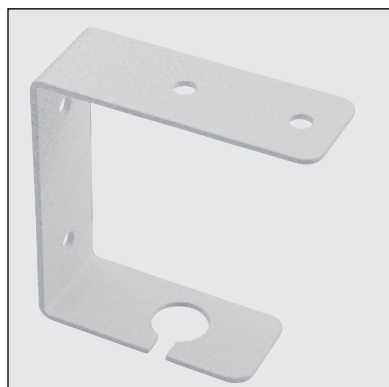
MODEL	DESCRIPTION
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HFCENTERCONTACT	NMOHF Center Contacts and Insulators - 10 each
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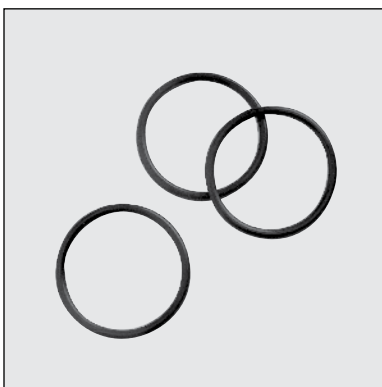
MODEL	DESCRIPTION
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NMOTEST1	Test adapter for NMO mount
----------	----------------------------



MODEL	DESCRIPTION
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OCBRACKET	3" Tall bracket for ceiling or wall mount, Cool Grey
-----------	--



MODEL	DESCRIPTION
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OLMMNT	O ring for LM mount
ONMOANT	O ring for NMO antennas/bases
ONMOMNT	O ring for NMO mount
OPOMNT	O ring for PO mount



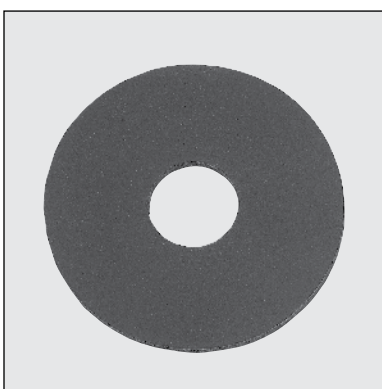
MODEL	DESCRIPTION
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QCONE.073	Chrome Q cone / Q base, .073 dia.
QCONE.100	Chrome Q cone / Q base, .100 dia.
QCONE.125	Chrome Q cone / Q base, .125 dia.



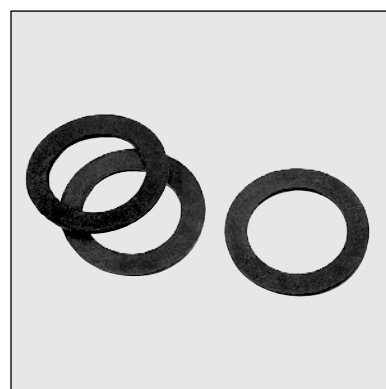
MODEL	DESCRIPTION
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QCONE.073B	Black Q cone / Q base, .073 dia.
QCONE.100B	Black Q cone / Q base, .100 dia.
QCONE.125B	Black Q cone / Q base, .125 dia.



MODEL	DESCRIPTION
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RGFB1ANT	Rubber gaskets for FB1 antenna
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MODEL	DESCRIPTION
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RGNMOANT	Rubber gasket for NMO coil/bases
RGPOMNT	Rubber gasket for PO mounts

COAX TYPES/PART NUMBERS



RG-174 - Small Diameter Coax

RG-174 is the industry standard for applications requiring a small diameter, highly flexible coax. Frequently used in mobile mag mount applications. Subject to higher losses at higher frequencies. Good performance for environmental variations but lower in overall ruggedness.

Recommended Applications

Mobile/Portable less than 900 MHz where flexibility and small diameter is important.

Larsen Part Number: RG-174
Stocking Lengths: 1000'/Spool
Cut to order



RG-213 - Stranded Bare Braid - Mil Spec QPI

This RG-8-sized cable uses a stranded center conductor with a polyethylene dielectric and PVC jacket. Built to Mil Specs this cable is used in all Larsen UHF/VHF products targeted for outdoor installation.

Recommended Applications

For lower frequency applications requiring high ruggedness.

Larsen Part Number: RG-213
Stocking Lengths: 500' or 1000'/Spool
Cut to order



RG-58U - Low Loss Dual Shield with Solid Center Conductor (UD)

This is Larsen's premium coax for 800 and 900 MHz applications. The solid center conductor (20 AWG) is easy to use with all connectors. Digital applications benefit from the 100% Duofoil aluminum shield. The shield is not glued to the dielectric making it easier to peel back for connector installation. The braid is 95% coverage. This cable is standard for most mounting kits over 800 MHz and can be special ordered with other frequencies. Uses standard RG-58 connectors.

Recommended Applications

For all applications at 800 MHz and above

Larsen Part Number: UD Coax
Stocking Lengths: 1000'/Spool
Cut to order



RG-58A/U - CX Standard Coax

The industry standard in quality, value-priced coax. Stranded center conductor offers good flexibility and long-life under most conditions. Not typically recommended for applications above 512 MHz due to higher losses. Uses standard RG-58 connectors.

Recommended Applications

General applications under 512 MHz. First choice for value priced coax.

Larsen Part Number: CX Coax
Stocking Lengths: 1000'/Spool
Cut to order



RG-58A/U - "Digi-Shield"™ Low Loss Braided Center

Employs two shields, consisting of a full aluminum/mylar wrap covered by a braid. This combination of shields, plus low-loss dielectric material and stranded center conductor makes an excellent choice for mobile applications. Performance features include low-loss and high flexibility. Uses standard RG-58 connectors.

Recommended Applications

Higher performance applications where lower loss and flexibility are important. Recommended for applications above 800 MHz.

Larsen Part Number: DS Coax
Stocking Lengths: 1000'/Spool
Cut to order



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